

# The Iron Age

INDEX TO  
READING MATTER  
PAGE 40.

A Review of the Hardware, Iron and Metal Trades.

INDEX TO  
ADVERTISEMENTS  
PAGE 27.

Published every Thursday Morning by DAVID WILLIAMS, Nos. 66 and 68 Duane Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXXVII: No. 13.

New York, Thursday, April 1, 1886.

\$4.50 a Year, Including Postage.  
Single Copies, Ten Cents.

## The Plant of the Dayton Coal and Iron Co.

Among the many enterprises which have been undertaken in the South in recent years there is none in connection with the iron trade which has attracted such widespread interest as that of the Dayton Coal and Iron Co., of Dayton, Tenn. This company have recently blown in their No. 1 furnace, and, as they are now producing the various grades of pig metal of satisfactory quality, it may be said they have substantially passed through the period of construction and are enrolled among the active enterprises of the South. The idea of making iron at Dayton originated some 12 or 15 years since, when very large tracts of mineral land were acquired with that object in view. At that time the production of coke pig iron in the South was carried on only to a very limited extent, and it may be said with truth that the business was only in an experimental stage, for, as is well known, the development at Birmingham is of more recent date. The projectors of the Dayton enterprise contemplated the transportation of their product by the Tennessee River to Chattanooga, and thence by rail to the various markets, for the Cincinnati Southern Railway, although surveyed through Dayton, was not built until some years later. The severe depression which rested on the iron trade for so many years after the panic of 1873, checking all enterprise, did not warrant the completion of these plans at that time. Early in 1884 the work of erecting blast furnaces, developing mines and constructing their railroad system was determined upon, and from that time the work has been vigorously pushed to completion. The two blast furnaces, with all their appliances, are said to be the most complete and substantial in the South, and will challenge comparison with any in the United States. Within 3 miles of the furnaces are the coal and ore mines and limestone quarry, all located upon the property of the company. A railroad has been constructed to the Tennessee River, about 3 miles distant, and when the improvement at Muscle Shoals is completed the company will be in position to transport their product through the great waterways to the more distant parts of the country not now accessible by rail. The completion of this enterprise may be said to mark a distinct era in the progress of the Southern iron trade. There are those in many parts of the country who even yet regard with curiosity the development of the iron industry of the South. The proprietors of the Dayton Coal and Iron Co. are to be congratulated upon the completion of their great enterprise, and we wish them success. The following is a description of the Dayton plant:

The blast furnaces of the Dayton Coal and Iron Co., Limited, are located at Dayton, Rhea County, Tenn., on the line of the Cincinnati Southern Railway, 38 miles from Chattanooga and 207 miles from Cincinnati. On the 9th of February No. 1 stack of this plant was successfully blown in, and up to this time has given its owners much satisfaction in its performance. The quality of the metal produced is said to be satisfactory, and the managers expect to improve on it as the furnace gets down to smooth working. The production has averaged nearly 100 tons per day so far, but it is not the intention of the management to make a record of large production at the expense of uniformity and excellence of quality. These stacks are each 20 feet in diameter of bosh and 75 feet high. The diameter of the bosh has been adversely commented upon by the trade as being too large for good running. The company have entered into this experiment with confidence, relying greatly on the quality of their coke to carry them through. The work on the stacks has been planned and carried out in the most modern style, and it is light, graceful and substantial. The lower part of the furnace is provided with special protection by cast-iron circle plates covered with  $\frac{1}{2}$ -inch extra strong pipe, and above the tuyeres there are built in the boshes four circles of bosh-cooling plates, extending to within  $\frac{1}{4}$  inches of the lines of the furnace. The brickwork is encircled with heavy bands of wrought iron, to prevent openings due to expansion of the inner circle of brickwork. Eight bronze tuyeres, 7 inches diameter of the nose, secured in water-cooled breasts, covered with double-thick gas-pipe coiled. The bustle-pipe, 42 inches diameter, lined with fire-brick to a clear way of 24 inches, circles all around the furnace, to which are attached eight blow-pipes, lined with brick, with weighted eye sights. The bell and hopper are of the latest construction. The hopper rests on plates which are carried by brackets riveted to the outside shell, entering independent of the brickwork, making the whole charging apparatus secure if the lining gives way. The charging-bell is hung from levers resting in the cast-iron arch which is erected on the hopper-plates. The bell is operated by an air-cylinder, with crab rack and safety bolts of ample dimensions. The furnaces are supported by three Whitwell fire-brick hot-blast stoves, of the most recent construction, 21 feet in diameter, 60 feet high. The inlets and hot-blast valves are all of full dimensions, and provided with water attachments throughout. The stoves are

connected with a fine chimney of graceful proportions, wrought-iron cased, lined with fire-brick to 8 feet clear diameter, 175 feet high. Each furnace has a special hoist tower of wrought-iron trussed-work, 103 feet high, divided in ten panels. On top of the columns is erected the top-house of corrugated iron. The hoist platforms are each 8 x 10 feet, worked by double cylinder Otis automatic engines, 10 x 12 inch cylinder, of the most approved pattern.

The casthouse is 120 feet wide, 160 feet long, is built of brick, the walls being at the eaves 25 feet high, and doorways, eight in number, 6 feet wide, 15 feet high, and at each end two large doors, 10 feet wide, 15 feet high, and opposite each furnace in the end two iron way doors, 6 feet wide, 22 feet high, through which the iron cradles pass on their way to the scales. The roof is in two sections, each 80 feet wide, supported by a row of wrought-iron trussed columns. The rafters are made up of 2 x 3 inch I-beams. The whole is decked with corrugated-iron roofing. The metal is carried out on cradles attached to an overhead runway, enabling the iron men to reach each bed with ease, thereby saving much labor.

The blowing engines are housed in a fine brick engine-house, 120 feet long, 38 feet wide, with walls 38 feet high. The engines are upright, with blowing cylinder overhead, the latter 84 inches diameter, 60-inch stroke; the steam cylinder, 36 inches diameter, 60-inch stroke. There are five engines, two for each furnace, and one spare engine for service during repairs. The furnaces are sup-

plied with separate blast mains, and each engine is arranged so as to blow either furnace or into either hot-blast stove, and the stoves are arranged so as to be applicable to either furnace. The water supply at these furnaces receive special attention. There are three large duplex Worthington pumps with steam cylinders 20 inches in diameter and water cylinders 14 inches in diameter, 12-inch stroke. Each of these pumps is ample for one furnace; the third is held in reserve. Three other pumps are provided for feeding the boilers; these have 12-inch steam cylinders, 7-inch water cylinders and 10-inch stroke; they are all duplex pumps. The large duplex pumps are arranged to force water either to the furnaces or to a tank erected in front of the engine-house. This is a cylindrical shell 30 feet in diameter, 32 feet high, with a dished bottom to receive the sediment. It is elevated on eight cast-iron columns, each 12 inches in diameter, 30 feet high. The tank has a capacity of 150,000 gallons. The boilers are 24 in number, 12 for each furnace, placed in 12 distinct batteries of two each; they are 46 inches in diameter and 34 feet long, each having two flues 16 inches in diameter. The shells of the boilers are of steel,  $\frac{3}{8}$  inch. The heads are of flange steel,  $\frac{1}{2}$  inch. The flues are of soft steel,  $\frac{1}{4}$  inch. Each battery is provided with its separate steam and mud drums, and separate feed-pipes. The whole setting is as complete as could be devised in order to secure continuous running without any stoppage for cleaning or on account of low steam. The several batteries are covered with iron roofs supported on wrought-iron trussed columns. Each set of batteries is connected with a separate draft-stack 125 feet high, 8 feet in diameter, covered with boiler plate of same style as the hot-blast stoves stack.

All the several parts of the plant are placed on substantial foundations of heavy limestone blocks placed on the gravel bottom. The stockhouses are of generous dimensions—350

long, 140 feet wide, in two sections of 70 feet each. Through this run four railway tracks on trestles. The roof is covered with corrugated iron, the frame of the building being of timber. In addition to this and running the whole length of the stockhouse on one side is a "lean-to" shed, through which runs a track on the level of the stockhouse floor. On this track run the coke cars, so arranged that three doors give access to the coke, which is shoveled direct into the furnace barrows, thereby avoiding a great deal of breakage, which is always so detrimental to the efficiency of this material in the furnace. The whole plant is arranged with a view to simplicity of operation and economical handling. The surrounding grounds are occupied with the various sidings for materials of all kinds and the delivery of pig iron.

The company own a very large tract of land near the furnace, upon which are numerous coal seams of good quality, very suitable for making coke. Some time since the company opened up several seams on Richland Creek, which they are now working. On this same creek, about midway between the mines and the furnaces, they have erected 200 beehive coke ovens and a capacious coal bunker, to hold 1500 tons of coal for coking purposes, also two coal crushers. The coal at Richland mines is of the average thickness of seams in the Waldensridge, 18 to 36 inches. Recently, however, the company have discovered and opened a seam that is 6 feet thick, and are at work now to connect this with their railway system and coke

Cincinnati. The general manager of the works at Dayton and in Georgia is Mr. Geo. Jamme. The management of the blast furnaces is in the hands of Mr. H. Hargraves, who is well and favorably known in the South.

## The Report of the Commissioner of Labor.

We present herewith some extracts from the first annual report of the Bureau of Labor which has been submitted by Commissioner Carroll D. Wright to the Secretary of the Interior. The report will cover about 500 pages, containing facts, figures and deductions concerning industrial depressions of a novel and interesting character. Under the head "The Industrial Depressions in the United States," Mr. Wright says: "From the observations of the agents of the bureau and from other sources from which it has been possible to form conclusions it is undoubtedly true that out of the total number of establishments, such as factories, mines, &c., existing in the country, about 5 per cent. were absolutely idle during 1885, and that perhaps 5 per cent. more were idle a part of the time; or, for a just estimate,  $7\frac{1}{2}$  per cent. of the whole number of such establishments were idle or equivalent to idle during the past year. Applying the percentage arrived at ( $7\frac{1}{2}$  per cent.), we obtain a total of 998,839 as constituting the best statement of the unemployed in the United States during 1885—meaning by the

crippled temporarily, experiencing a few months of severe stagnation until a temporary removal of the glut in the market brought them up again; but on the whole the volume of business of the country during the depressed period has been fairly satisfactory.

"The mechanical industries of the United States are carried on by steam and water power representing in round numbers 3,400,000 horse-power, each horse-power equalling the muscular labor of six men—that is to say, if men were employed to furnish the power to carry on the industries of this country it would require 21,000,000, and 21,000,000 men represent the population, according to the ratio of the census of 1880, of 105,000,000. The industries are now carried on by 4,000,000 persons, in round numbers, representing a population of 20,000,000 only. To do the work then accomplished by power and power machinery in our mechanical industries and upon our railroads would require men representing a population of 172,500,000 in addition to the present population of the country of 55,000,000, or a total population, with hand processes and with horse-power, of 227,500,000, which population would be obliged to subsist on present means. In an economic view the cost to the country would be enormous. The present cost of operating the railroads of the country with steam-power is in round numbers \$502,000,000 per annum, but to carry on the same amount of work with men and horses would cost the country \$11,308,500,000. These illustrations, of course, show the extreme straits to which a country would be brought if it undertook to perform its work in the old way. It is true that in those countries where machinery has been developed to the highest the greatest number of workpeople are engaged, and that in those countries where machinery has been developed to little or no purpose poverty reigns, ignorance is the prevailing condition, and civilization, consequently, far in the rear.

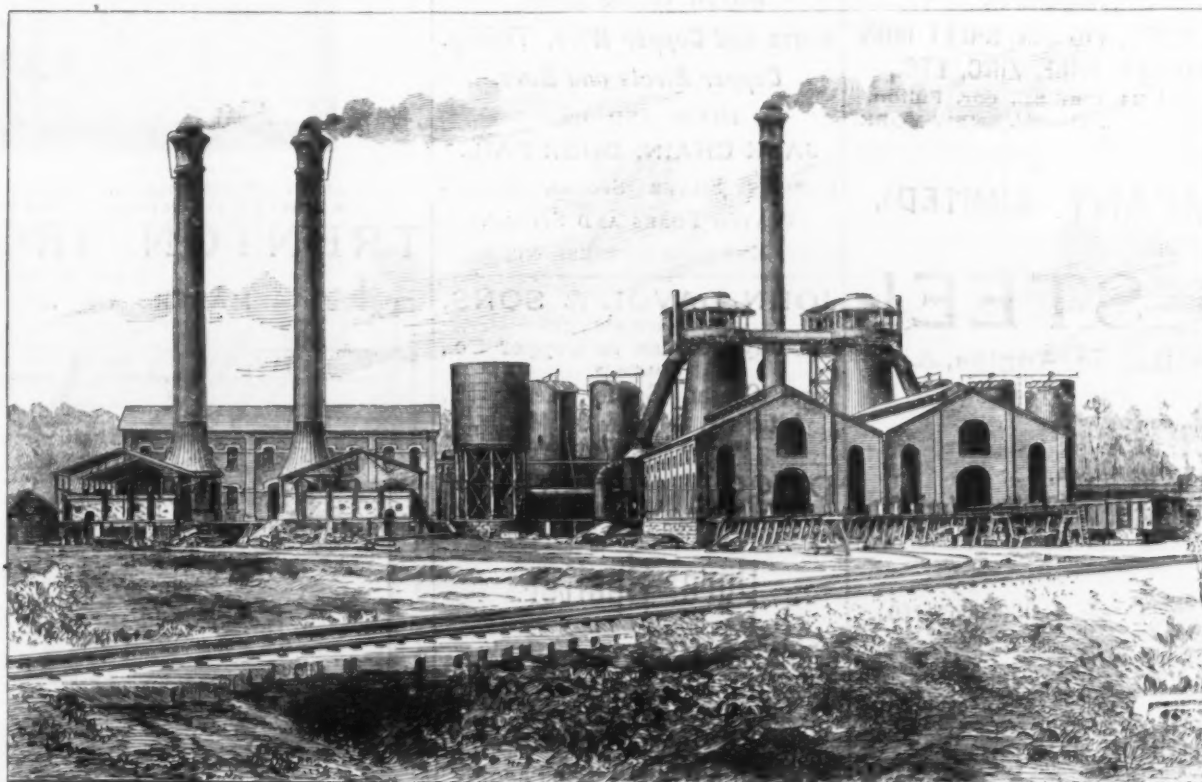
"Yet, if the question should be asked, Has the wage worker received his equitable share of the benefits derived from the introduction of machinery? the answer must be, No. In the struggle for industrial supremacy in the great countries devoted to mechanical productions it probably has been impossible for him to share equitably in such benefits. His greatest benefit has come through his being a consumer. In many instances the adult male has been obliged to work at a reduced wage, because, under improved machinery, women and children could perform his work, but the net earnings of his family stand at a higher figure than of old. It is also true that, while labor has been displaced apparently in many directions and in many industries, machinery has brought new occupations, especially to women. The apparent evils resulting from the introduction of machinery and the consequent subdivision of labor have to a large extent, of course, been offset by advantages gained; but it must stand as a positive statement which cannot successfully be controverted that this wonderful introduction and extension of machinery is one of the prime causes, if not the prime cause, of the novel industrial condition in which the manufacturing nations find themselves.

"An influential cause in producing the condition of things recited as to the abnormal increase of machinery and the development of industrial enterprise has been the facility with which stock companies could be organized. In fact, the modern system of carrying on great works by stock companies has done much work toward producing in all countries the bad industrial conditions under which the present generation is laboring. The result has been a somewhat reckless and abnormal organization of capital and of interests aimed at the development of the industries of the country. Material, labor, capital, have been overconsumed, and to such an extent that overproduction stands for overconsumption. The reckless consumption of all the materials and elements necessary to industrial progress has always produced industrial stagnation.

"The employment of contract labor of foreign importation and rapid immigration generally are features which have a positive influence in crippling consuming power. "By the census of 1880 the whole number of people engaged in agriculture in the United States was 7,670,493. Into the total number then engaged in agriculture there had been absorbed 812,829 foreign born—that is, the foreign born constituted 10.50 per cent. of the whole number employed in agriculture. The total number employed in the country in manufactures, mechanical and mining industries was 3,837,112. Into this number had been absorbed 1,225,787 of the foreign born, or 31.9 per cent. of the whole number. It will be seen at once that the tendency of immigrants is to assimilate with our mechanical industries. This increases the supply of labor in comparison to the demand, lowers wages, contributes to whatever overproduction exists and cripples most decidedly the consuming power of the whole.

"In examining the facts one sees that prior to each period of depression since 1837 there has been a large increase in immigration, and following the inception of the depression a sharp falling off. As times became prosperous after each period immigration

(Continued on page 5.)



THE PLANT OF THE DAYTON COAL AND IRON CO.







**O. LINDEMANN & CO.,**  
MANUFACTURERS OF  
Japanned, Brass, Tin  
Plated and Wood



**BIRD CAGES.**

254 PEARL STREET, NEW YORK.

**CARY & MOEN,**  
MANUFACTURERS  
STEEL WIRE for all purposes and STEEL SPRINGS of every description.

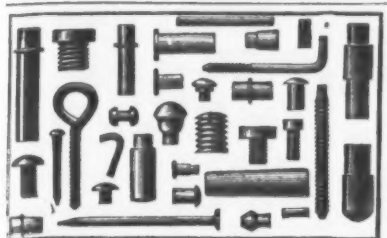


Market Steel Wire, Crinoline Wire, Tempered and Covered.  
Also PATENT TEMPERED STEEL FURNITURE SPRINGS, constantly on hand.  
234, 236 and 238 West 29th Street, NEW YORK.

**FRED. J. MYERS MFG. CO.,**  
COVINGTON, KY., Manufacturers of  
WIRE GOODS OF ALL KINDS.



Wrought-Iron Fencing, Cresting and Hardware Specialties.  
Send for Illustrated Catalogue and Price List.



**IRON AND BRASS RIVETS,**  
STUDS, PINS, SCREWS, &c.  
For Manufacturers of Light Hardware.  
**BLAKE & JOHNSON, WATERBURY, CONN.**

**W. S. TYLER**  
WIRE WORKS CO.  
SUCCESSORS TO W. S. TYLER,  
MANUFACTURERS OF  
**STEEL WIRE CLOTH**  
Of Every Description,  
for mining purposes. All meshes from 2 to the  
inch up to 10 mesh made and carried in stock.  
W. S. TYLER, Pres., E. H. ALLEN, Sec. & Treas.  
CL. VELAND, OHIO.

**SEDGWICK**  
**STEEL WIRE FENCE**



Is the best general purpose wire fence in use. It is a strong net-work without barbs. It won't injure stock. It will turn dogs, pigs, sheep and poultry, as well as horses and cattle. The best fence for Farms, Gardens, Stock Ranges and Railroads. Very neat, pretty styles for Lawns, Parks, School-lots and Cemeteries. Covered with rust-proof paint, or made of galvanized wire, as preferred. It will last a life-time. It is better than barbed or barbed wire in every respect. The Sedgwick Gates made of wrought-iron pipe and steel wire, defy all competition in lightness, neatness, strength and durability. We make the best, cheapest and easiest working all-iron automatic or self-opening gate, and the neatest cheap iron fence now made. The best Wire Stretchers, Cutting Pliers and Post Augers. For prices and particulars ask Hardware Dealers, or address, mentioning paper.  
**SEDGWICK BROS., Richmond, Ind.**  
**EDWARD SUTTON, Eastern Agent,**  
300 Market St., Philadelphia, Pa.

The Carriage and Wagon Springs turned out by the GAUTIER STEEL DEPARTMENT of CAMBRIA IRON CO. are made from their celebrated "Per-not" Spring Steel (BESSEMER Steel is never used for Springs). All springs are oil-tempered, hand-fitted, carefully tested and rigidly inspected before leaving the factory. They are unsurpassed in quality, superior in finish and handsome in appearance. Leading sizes carried in stock.

New York Office: 104 READE ST.  
Chicago Office: 202 First Nat. Bank Building.  
Philadelphia Office: 523 ARCH ST.  
[No 148.]



Established 1818. Incorporated 1874.  
**GILBERT & BENNETT MFG. CO.**  
WAREHOUSES:  
42 Cliff St., New York.  
225 Lake St., Chicago, Ill.  
MANUFACTURERS OF  
Iron & Galvanized Wire  
Sieves and Wire Cloth.  
Power Loom Painted and Galvanized Window Screens Wire Cloth. Galvanized Wire Cloth for Drying Fruits. World's Galvanized Web Wire Fence, Galvanized Twist Wire Fencing Netting.  
Factories, Georgetown, Conn.

**NIEN-TSI CHINESE LACQUER,**  
Manufactured by ALBERT AFSMAN & SONS.  
UNEQUALLED FOR DURABILITY. Prevents Iron, Steel, Brass, Nickel, Copper, Silver, Bronze and all compositions from corroding. Also resists dampness, KEROSENE OIL and FLY SPECKS. Can be applied without heating metal.  
Sole Agents, **H. S. ALLEN & CO., 112 John St., New York.**  
Would call special attention to manufacturers of Agricultural Implements, Machinery and Architectural Iron Works. Sample and Prices sent on application.

**LANE'S PATENT STEEL DOOR HANGER.**  
The most perfect Anti-Friction Hanger in the Market, BECAUSE  
It is made of steel throughout, except the wheel which has a steel axle. It will not break. It is practically free from wear. It is almost noiseless in action. It requires no oil. It has a broad bearing on the door, and keeps in line. It is by far the most durable. It may be used with any track. It is always in order.  
LANE'S PATENT TRACK  
Is made of steel and is easily put in position. Catches and holds no snow or ice. Door hung thereon cannot jump the track. Is not subject to decay. Requires no fitting, but is ready at once. May be used with hangers of other manufacture.  
Manufactured by **LANE BROS., Poughkeepsie, N. Y.**  
**JOHN H. GRAHAM & CO., General Agents, 113 Chambers Street, NEW YORK.**

**PHOSPHOR-BRONZE**  
TRADE MARKS  
For Bearings, Slide Valves, Cylinder Rings, Cross-Head Gibs, Steps, Bushings, and all purposes where Maximum Durability, Anti-Frictional and Non-Cutting Qualities are desirable. Pump Rods, Bolts and Nuts, Machine and Wood Screws, &c., &c. Combine Toughness, Strength, Durability and Resistance to Corrosion. Castings of all kinds to order. Send for pamphlet and prices.  
**THE PHOSPHOR-BRONZE SMELTING CO., LTD.,**  
No. 512 Arch Street, PHILADELPHIA, PA.,  
Owners of the U. S. Phosphor-Bronze Patents. Sole Manufacturers of Phosphor-Bronze in the U. S.

**"SILVER FINISH"**  
Galvanized POULTRY NETTINGS.  
FOR SALE BY THE HARDWARE TRADE. GET THE BEST.

**MORGAN SPRING CO.**  
WORCESTER, MASS.




**LUDLOW-SAYLOR WIRE CO.,**  
ST. LOUIS, MO.

**WIRE, WIRE CLOTH, WIRE ROPE,**  
Counter Railings, Window Guards, Iron and Wire Fences,  
Plain and Barbed Fencing Wire.




**ROOF CRESTING,**  
Tower Ornaments, Vanes, and Stable Fittings.  
FULL LINE OF EACH MANUFACTURED BY  
**National Wire & Iron Co., DETROIT, MICH.**  
Send for Catalogue, stating your wants. Liberal Discounts to the Trade.



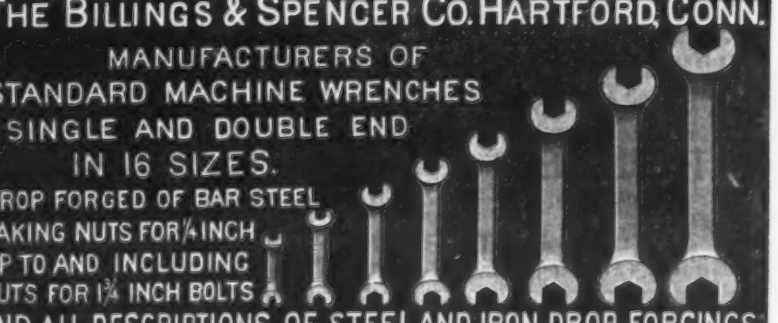
**THOMPSON MCCOSH, President.** **JOHN A. MCCOSH, Sec. and Treas.**  
**BARB WIRE** **LIFTER AND CARRIER.**  
NO DANGER OF CUTTING HANDS OR TEARING CLOTHES.  
SAVES THE PRICE OF THE LIFTER MANY TIMES EVERY DAY.  
Manufactured Solely by  
**Hawkeye Steel Barb Fence Co., Burlington, Iowa.**  
Our Agents, John H. Graham & Co., 113 Chambers St., carry stock of our Lifters and will supply at Factory prices.



**HOLLOW CABLE MFG. CO., Hornellsville, N. Y.** We also manufacture extensively four different sizes Wire Clothes Lines. Send for Circulars and Price Lists.  
**C. S. CHAMBERLAIN, 55 Dearborn St., Chicago, Ill.**



**THE BILLINGS & SPENCER CO. HARTFORD, CONN.**  
MANUFACTURERS OF  
STANDARD MACHINE WRENCHES  
SINGLE AND DOUBLE END  
IN 16 SIZES.  
DROP FORGED OF BAR STEEL  
TAKING NUTS FOR 1/4 INCH  
UP TO AND INCLUDING  
NUTS FOR 1 1/2 INCH BOLTS  
AND ALL DESCRIPTIONS OF STEEL AND IRON DROP FORGINGS.



**WICKWIRE BROTHERS, CORTLAND, N. Y.,**  
MANUFACTURERS OF  
**WIRE CLOTH AND WIRE GOODS,**  
Dish Covers,  
Corn Poppers,  
Coal Sieves,  
Flour Sieves,  
Etc., Etc.  
"CORTLAND"  
WINDOW SCREEN  
WIRE CLOTH.  
Metallic Coal Sieve.



**WIRE NAIL MACHINES**  
(HARDMAN PATENT.)  
Thoroughly Tested and in Successful Operation.  
For prices and particulars address the Manufacturers,  
**BIRMINGHAM IRON FOUNDRY,**  
FOUNDERS AND MACHINISTS,  
BIRMINGHAM, CONN.

**W. B. WOODMAN & CO.,**  
10 and 12 Ward Street,  
NEWARK, N. J.

**STEEL WIRE BUCKLE,**  
Size 3/4.  
Catalogues and Prices furnished on application.  
The above Buckle is made of Wrought Wire and of one piece; the Tongue is loose and free.  
SPECIALTIES: Cork Screws, Cheap and Expensive Styles, Easels, Egg Beaters, Fancy Twisted Wire Work, Wire Forks and Toasters.  
Estimates cheerfully furnished on New Goods. Models made and Machinery built and perfected.  
**W. B. WOODMAN & CO.,**  
10 and 12 Ward St., Newark, N. J.



**E. T. BARNUM,**  
MANUFACTURER  
**WIRE AND IRON WORK**  
Detroit, Mich.



The Popular Polish of the world.  
For sale by all dealers in U.S.A. and Canada. Price List Free.  
**THE PARLOR MFG. CO.,**  
84 Fulton St., Boston.





**OGDEN & WALLACE,**  
85, 87, 89 & 91 Elm St., New York.  
**Iron AND Steel**  
Of every description kept in stock.  
Agents for Park, Brother & Co.'s  
**BLACK DIAMOND STEEL.**  
All sizes of Cast and Machinery Steel constantly on hand.

**PIERSON & CO.,**  
24 to 27 West Street, New York,  
**Acme Shafting.**  
ALL SIZES AND LENGTHS IN STOCK.  
Apply for Discount.

**ABEEL BROTHERS,**  
ESTABLISHED 1765,  
Iron \* Merchants,  
190 SOUTH ST., NEW YORK.  
365 WATER ST., NEW YORK.  
**"CATASAUQUA" IRON.**  
Large Assortment of Extra Heavy Sizes on Hand.  
"ARM CO." SHAFTING.

Also general assortment of Norway, Ulster and Refined Bar, Band, Hoop, Scroll, Angle Iron; Steel of all kinds, &c.

**A. R. WHITNEY & CO.,**  
MANUFACTURERS OF AND DEALERS IN  
**Iron and Steel**

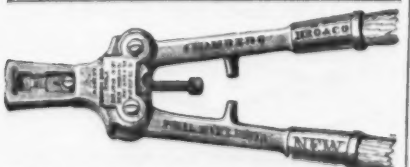
**AGENCIES:**  
PORTAGE IRON CO., Limited, Merchant Iron and Soft Steel and Cut Nails and Spikes.  
NORWAY STEEL & IRON CO., Homogeneous Steel Plates.  
BAY STATE IRON CO., Tank, Boiler and Girder Plates.  
BRANDYWINE ROLLING MILL, Boiler Plates.  
GLASGOW TUBE WORKS, Boiler Flues.  
A. M. BYERS & CO., Wrought Iron Pipe.  
CARNegie Bros. & Co., Limited, Iron and Steel Beams, Channels, Shapes and Shafting.  
BROOKLYN WIRE NAIL CO., Steel Wire Nails.  
THE CHESTER PIPE AND TUBE CO.  
Plans and estimates furnished and contracts made for erecting Iron Structures of every description. Books containing cuts of all iron made sent on application by mail. Sample pieces at office. Please address 58 Hudson St., New York.

**Borden & Lovell,**  
70 & 71 WEST ST.,  
L. N. LOVELL,  
C. A. GREENE,  
H. L. FREELAND,  
New York.  
Agents for the sale of

**FALL RIVER IRON WORKS CO.'S**  
Nails, Bands, Hoops and Rods.  
**DANVILLE NAIL & MFG. CO.'S**  
NAILS AND SPIKES.  
**BORDEN MINING CO.'S**  
CUMBERLAND COAL.

**IMPORTED & AMERICAN**  
**PIG IRON.**  
LAKE SUPERIOR CHARCOAL IRON,  
For Malleable and Car-Wheel Purposes,  
A SPECIALTY.

**CHARLES HIMROD & CO.,**  
CHICAGO AND DETROIT.



**BOLT & RIVET CLIPPERS,**  
For cutting off the ends of Bolts and Rivets, on carriages, wagons, harness, &c. Ask for them where you buy your hardware, or send for circular and price list.  
**CHAMBERS, BROTHER & CO.,**  
52nd St., Below LANCASTER AVE.,  
PHILADELPHIA, PA.

**PASSAIC ROLLING MILL CO.**  
Manufacture and have always in stock  
**ROLLED IRON BEAMS,**  
Channels, Angles, Tees, Merchant Bars, Riveted Work, Forgings, Eye Bars, &c.,  
**PATERSON N. J.**  
Room 45, Astor House, New York.

**CUT NAILS,**  
Hot Pressed Nuts, Bolts, Washers, &c.  
**DOVER IRON CO.'S**  
Boiler Rivets, Boiler Brace Jaws, Socket Bolts,  
**BAR IRON.**

**FULLER BROTHERS & CO.,**  
139 GREENWICH ST., NEW YORK.

**Marshall Lefferts & Co.,**  
90 Beekman St., New York City,  
MANUFACTURERS OF  
**Galvanized Sheet Iron,**  
Best Bloom, Best Refined and Common.  
Galvanized Wire, Telegraph and Fence; Galvanized Hoop and Band Iron. Galvanized Rod and Bar Iron. Galvanized Nails, Galvanized Chain, Galvanized Iron Pipe.

**CORRUGATED SHEET IRON**  
For Roofing, &c., Galvanized, Plain or Painted.  
Best Charcoal, Best Refined and Common  
**SHEET IRON.**

**PLATE AND TANK IRON,**  
C. No. 1, C. H. No. 1, C. H. No. 1 Flange, Best Flange, Best Flange Fire Box, Circles.  
ALL DESCRIPTIONS OF  
IRON WORK GALVANIZED OR TINNED TO ORDER.  
Price list and quotations sent upon application.

**JOHN FOX,**  
Cast Iron Gas and Water Pipe.  
2 to 48 Inches Diameter,  
160 BROADWAY, NEW YORK.

**JAMES WILLIAMSON & CO.,**  
SCOTCH AND AMERICAN

**PIG IRON,**  
No. 63 Wall St., New York.

**DANIEL F. COONEY,**  
88 Washington St., New York,  
**IRON AND STEEL BOILER PLATES.**

GLASGOW IRON CO. PINE IRON WORKS.  
ALLISON BOILER FLUES.

**B. F. JUDSON,**  
Importer of and Dealer in  
SCOTCH AND AMERICAN

**Pig Iron,**  
WROUGHT & CAST SCRAP IRON,  
OLD METALS.  
457 & 459 Water St., NEW YORK.  
233 & 235 South St., NEW YORK.

**Scythe Rifles**  
VERY LOW IN PRICE.  
**JOHN BROWER,**  
81 Murray Street.

**CHAS. F. LOMBARD**  
August 9  
Ga.  
MANUFACTURERS OF  
GIN RIBS &  
RAILROAD CASTINGS.

**HICKS & DICKEY,**  
413 Commerce Street, PHILA., PA.

**Iron, Steel & Forgings.**  
**STEEL CASTINGS.**

MERCHANT IRON & SOFT STEEL.  
COLD ROLLED & TURNED SHAFTING.  
AGENCIES:  
**CROWN & CUMBERLAND STEEL CO.,**  
CAST TOOL STEEL.  
**HARTMAN STEEL CO., Ltd.,**  
Tire, Tee, Sleigh, Machinery, Spring Steel, &c.  
**CHARLES L. BAILEY & CO.,** Chesapeake Nails.  
**HARTMAN STEEL CO., Ltd.,** Steel Wire Nails.

**OXFORD**  
**IRON AND NAIL CO.,**  
**Cut Nails**  
AND  
**SPIKES.**

**J. S. SCRANTON, Sales Agent,**  
81, 83 and 85 Washington Street,  
NEW YORK.

**JOHN J. HARRISON**  
(Successor to HARRISON & GILLOON).  
**IRON AND METAL DEALER,**  
554, 556, 558 WATER ST. & 522, 524, 526 CHERRY ST.  
NEW YORK.  
has on hand, and offers for sale, the following:  
Scotch and American Pig Iron, Wrought, Cast and Machinery Scrap Iron, Car Wheels, Axles and Heavy Wrought Iron; also old Copper, Composition, Brass, Lead, Pewter, Zinc, &c.

**BURDEN'S**  
**HORSE SHOES.**

"Burden Best"  
Iron  
Boiler Rivets.

**THE BURDEN IRON CO.**  
TROY, N. Y.

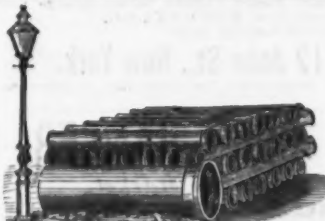
**WILLIAM H. WALLACE & CO.,**  
**Iron Merchants,**  
Cor. ALBANY & WASHINGTON STS.,  
NEW YORK CITY.

Wm. H. Wallace. Wm. Bispham. E. C. Wallace.

**J. H. Sternbergh, Reading, Pa.,**  
MANUFACTURER OF  
**REFINED BAR IRON.**  
Also a Specialty

**Bolts, Nuts, Washers, Rivets,**  
LAG SCREWS, TURNBUCKLES,  
Rods and Forgings for Bridges and Buildings,  
&c., &c., &c.

**WM. MCFARLAND,**  
**Iron and Brass Founder,**  
TRENTON, N. J.  
Chilled Cast Wire Dies a Specialty.  
Any size or style made at short notice.



**R. D. WOOD & CO.,**  
PHILADELPHIA,  
Manufacturers of  
**Cast Iron Pipe**  
FOR WATER AND GAS,  
LAMP POSTS, VALVES, ETC.

Mathew's Pat. Anti-Freezing Hydrants.  
400 CHESTNUT STREET.

**A. F. PIKE MFG. CO.,**  
Pike Station, New Hampshire, U. S. A.  
Cable Address, "Pike, Haverill."  
MANUFACTURERS AND WHOLESALE DEALERS IN  
**BLUE STONE.**  
The Largest Manufacturers and Dealers in Stones for Sharpening all Edge Tools.

Pike's celebrated Blue Stone, Indian Pond (Red End), Limestone, Black Diamond, Magic, Green Mountain. All kinds branded with our name are genuine.  
Also Oil, Water and Dry Whetstones; Arkansas Whetstone, Turkey, Hindostan and Sandstone Razor Hones Vienna Cigar shape.  
In fact, everything that is used for sharpening Edge Tools supplied in any grit or shape required. Quality and Price guaranteed. Send in your orders.

**VARIETY METAL BOOM.**  
**Iron Foundry and Machine Shop.**  
STEAM HEATING BY DIRECT RADIATION in all its Branches a Specialty. Brass and other Metal Moulding, Casting and Finishing. Noiseless Vertical Engines, Hydrants, Fire Plugs, &c.  
**FRAS. H. BANNAN,**  
Pottsville, Schuylkill Co., Pa.

**W. & D. WOOD CO., L'd,**  
PITTSBURGH, PA.,



MANUFACTURERS OF PATENT  
**Planished Sheet Iron.**

Patented April 8th, 1873; Sept. 9th, 1873; Oct. 6th, 1874; Jan. 11, 1876; Oct. 17th, 1876; Jan. 11th, 1877; Feb. 6th, 1877; Dec. 10th, 1878; Jan. 10th, 1882; Jan. 18th, 1884; Feb. 12th, 1884; March 4th, 1884; Jan. 6th, 1885.

Guaranteed fully equal in all respects to the

IMPORTED RUSSIA IRON,  
and at a less price.

ALSO  
Common, Refined, Charcoal and Juniata  
GRADES OF  
**BLACK SHEET IRON,**  
Smooth on both sides.

**SYRACUSE**  
**MALLEABLE IRON**

**WORKS,**  
SYRACUSE, - N. Y.

Mower and Reaper Castings and  
Carriage Irons a Specialty.

**W. B. BURNS, PROPRIETOR.**

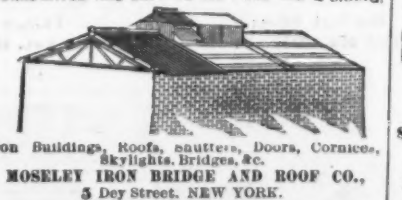
**PENNSYLVANIA IRON WORKS**

**Everson, Hammond & Orr, Ltd.,**  
SECOND AVE., PITTSBURGH, PA.,  
MANUFACTURERS OF

**Light Sheet Iron.**

**ROOFING SHEET**  
of all grades a specialty.  
Prices quoted promptly upon application.

CORRUGATED AND CRIMPED IRON ROOFING & SIDING.



Iron Buildings, Roofs, shutters, Doors, Cornices, Skylights, Bridges, &c.  
**MOSELEY IRON BRIDGE AND ROOF CO.,**  
3 Day Street, NEW YORK.

**GEORGE WESTINGHOUSE, Jr., Pres.** **JOHN CALDWELL, Treas.**  
**H. H. WESTINGHOUSE, Gen'l Agt.** **T. W. WELSH, Supt.**  
**W. W. CARD, Secy.**

**Westinghouse Air-Brake Co.**  
PITTSBURGH, PA., U. S. A.,

MANUFACTURERS OF THE  
WESTINGHOUSE AUTOMATIC BRAKE, Westinghouse Locomotive Driver  
Brake, Vacuum Brakes (Westinghouse & Smith Patents).

**WESTINGHOUSE FREIGHT BRAKE.**

The Automatic Freight Brake is essentially the same apparatus as the Automatic Brake for passenger cars, except that the various parts are so combined as to form practically one piece of mechanism, and is sold at a very low price. The saving in accidents, flat wheels, brakemen's wages, and the increased speed possible with perfect safety, will repay the cost of its application within a very short time.

The "Automatic" has proved itself to be the most efficient Train and Safety Brake known. Its application is instantaneous; it can be operated from any car in the train if desired, and should the train separate, or hose or pipe fail, it applies automatically. A GUARANTEE is given customers against loss from PATENT SUITS on the apparatus sold them.

The WESTINGHOUSE BRAKE is now fitted to upward of  
**15,000 ENGINES AND 80,000 CARS**  
and is adopted by the principal Railways in all parts of the world.

FULL INFORMATION FURNISHED ON APPLICATION.

**LEECHBURG IRON WORKS.**

**KIRKPATRICK & CO., LIMITED,**  
Manufacturers of all Grades of

**FINE SHEET IRONS,**  
(Refined, Cold Rolled, Show Card, Stamping, Tea Tray, Polished, Shovel, Ferrule Iron, &c.)

NATURAL GAS USED AS FUEL.  
OFFICE, No. 143 First Ave., Pittsburgh, Pa.

**WORKS, Leechburg, Pa.**

CLOSES ON OUTSIDE OF NOSE.  
Only Double Ring Invented.

**Champion Hog Ringer,**  
RINGS and HOLDER.

The only Ring that will effectively keep Hogs from rooting. No sharp points in the nose.

**CHAMBERS, BERING & QUINLAN CO.,** Exclusive Manufacturers, Decatur, Ill.

**THE ESSEX HORSE NAIL CO., LIMITED**

ESSEX. ESSEX CO., NEW YORK.

**The Essex Horse Nails**

Are drawn from the best Swedes Iron Rods only. They are hot-forged and cold-pointed, rendering them tough, stiff and easy driving, and are warranted

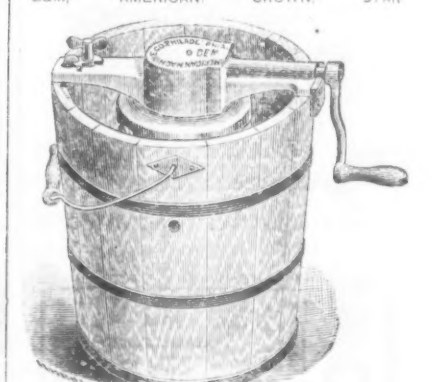
**FIRST-CLASS IN EVERY RESPECT.**

All Nails branded "ESSEX" are Fully Guaranteed.

**T. P. BURKE & CO.,** 100 Chambers St., New York, AGENTS.

**AMERICAN MACHINE CO.,**  
PHILADELPHIA, PA.,

**Ice Cream Freezers,**  
"GEM," "AMERICAN," "CROWN," "STAR"



BEST IN THE WORLD.

WRITE FOR CATALOGUE AND PRICES BEFORE ORDERING ANY OTHER MAKE

BUY THE CROWN ICE CHIPPER.  
**Manhattan Rolling Mill.**

**J. LEONARD,**  
445 to 451 West St., NEW YORK,  
177 & 179 Bank St.,  
MANUFACTURER OF

**HORSE SHOE IRON,**  
Toe Calk Steel, Rods, Ovals Half Ovals and Flats.

**Bonnell, Botsford & Co.,**  
**IRON, NAILS AND SPIKES**

YOUNGSTOWN, OHIO.

**Howard, Childs & Co.,**  
**Commission Merchants,**  
No. 514 Smithfield St., Pittsburgh, Pa.

**Iron and Steel of all Descriptions,**  
Iron and Steel Nails, Heavy Hardware,  
Coa Hods, Dripping Pans, &c.

Pittsburgh Manufactured Goods of all Kinds.

Correspondence solicited. Prices on application.

**E. JENCKES MANFG. CO.,**

PAWTUCKET, R. I.

Bright Wire Goods, Belt Hooks,  
**SPRING PINS, KEYS AND COTTERS.**

Best Wire Goods of all kinds a Specialty.

New York Office, 88 Chambers Street,  
SAMUEL A. HAINES, Selling Agent.

T. W. WELSH, Supt.  
W. W. CARD, Secy.



**WILLIAM R. HART & CO.,**  
AMERICAN AND FOREIGN  
**PIG IRON, SPIEGELEISEN,**  
STEEL BLOOMS, CROP ENDS,  
TIN PLATES, &c.  
No. 226 WALNUT ST., PHILADELPHIA.

**HENRY LEVIS & CO.,**  
**Manufacturers' Agents**  
For Iron and Steel Rails, Car Wheels, Boiler  
and Sheet Iron and General  
Railway Equipments.  
Old Rails, Axles and Wheels bought and sold.  
234 S. 4th St., Philadelphia.

**Heavy Rails, Light Rails,**  
**Railway Fastenings,**  
**STREET**  
**RAILS**  
**Cambria Steel Rails.**  
ADDRESS  
**Cambria Iron Co.,**  
OFFICE, 218 South Fourth St., Philadelphia, Pa.  
WORKS, Johnstown, Pennsylvania.

**The Phoenix Iron Co.,**  
410 WALNUT ST., PHILADELPHIA,  
Manufacturers of Wrought Iron  
**Beams, Deck Beams, Channels, Angle & Tee Bars,**  
STRAIGHT AND CURVED TO TEMPLATE,  
Largely used in the construction of Iron Vessels, Buildings and Bridges.  
Wrought Iron Roof Trusses, Girders and Joists, and all kinds of Iron Framing used in the con-  
struction of Fire-Proof Buildings; Patent Wrought Iron Columns, Weldless  
Eye Bars, and Built-up Shapes for Iron Bridges.  
REFINED BAR, SHAFING, and Every Variety of SHAPE IRON Made to order.  
Plans and Specifications furnished. Address **DAVID REEVES, President.**  
New York Agents, **MILLIKEN & SMITH, 95 Liberty St.**  
Boston Agents, **FRED. A. HOULETTE & CO., 19 Battery March St.**

**ALAN WOOD COMPANY,**  
MANUFACTURERS OF  
Patent Planished, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom  
**PLATE & SHEET IRON,**  
ALSO LIGHT PLATES AND SHEETS OF STEEL.  
No. 519 Arch Street, Philadelphia, Pa.  
Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack,  
Tank and Boat Iron; Last, Stamping, Ferrule Locomotive Headlight and Jacket Iron.

**W. H. WALBAUM & CO.,**  
206 S. Fourth St., Philadelphia. 61 Pine St., New York.  
**NEW AND OLD RAILS, BLOOMS, BESSEMER PIG.**  
Crop Ends, Spiegeleisen, Iron Ores and Railroad Supplies Generally.  
AGENTS IN THE UNITED STATES FOR  
THE NORTH LONSDALE IRON & STEEL CO., Limited, Bessemer Pig Iron, brand "Ulverston;"  
Malleable Pig Iron, brand "U. H. M."  
MOSS BAY HEMATITE IRON & STEEL CO., Limited, Spiegeleisen, Crop Ends, &c.  
Also for "Lorn" Malleable Charcoal Pig Iron and N. B. ALLEN & CO.'S Dinas Fire Bricks.  
Also Sole Agents for the WHITE RIVER MINING CO.'S Arkansas Manganese Ore, Guaranteed 30 per  
cent. Metallic Manganese.

**PENCOYD IRON WORKS,**  
**A. & P. ROBERTS & CO.,**  
MANUFACTURERS OF  
**BEAMS, CHANNELS, DECK BEAMS, ANGLES, TEES,**  
**PLATES, MERCHANT BAR.**

**STANDARD**  
SHAFTING AND ROLLED OR HAMMERED AXLES OF IRON OR STEEL.  
Office, No. 26 S. Fourth St., Philadelphia. Agents for the sale of Glamorgan Pig Iron

**GORDON, STROBEL & LAUREAU,**  
ENGINEERS,  
No. 226 Walnut Street, Philadelphia, Pa.  
AGENCY  
**Fire Brick Hot Blast Stove Co.**  
**WHITWELL HOT BLAST STOVE.**  
**COWPER HOT BLAST STOVE.**  
**Gordon Whitwell-Cowper HOT BLAST STOVE.**  
The latter improvement, at 30% less first cost, will heat more blast to a  
higher temperature with greater regularity.  
Weaknesses of the older types of stoves, whether in their construction  
or operation, eliminated.

**THE ALLENTOWN ROLLING MILLS,**  
MANUFACTURERS OF  
Rails, Bars, Axles, Shafting, Fish Bars (Plain and Angle), Spikes,  
Rivets, Bolts and Nuts, &c. Bridges and Turn-Tables.  
General Office, 237 South Third St., Philadelphia. Works at Allentown, Pa.

**THIS**  
**TUBE-CLEANING BRUSH**  
Is acknowledged as decidedly the best in the market,  
and, now that we have full control of the patent,  
it is our intention to sell them at reduced  
prices. Send your orders to  
**J. W. PAXSON, & CO.,**  
No. 1021 North Delaware Ave., Phila., Pa.  
MANUFACTURERS OF **WIRE WORK** OF ALL DESCRIPTION.  
INCLUDING  
Steel Wire Cleaning Brushes, Iron Brooms for Roll-  
ing Mills, Stables and Machine Shops, Riddles,  
Window Screening, &c., &c.  
ALSO MANUFACTURERS OF  
Foundry Facings, and Dealers in Molding Sand and  
all kinds of Foundry Supplies.

**EDWARD J. ETTING**  
**IRON BROKER & COMMISSION MERCHANT,**  
222 S. Third St., PHILADELPHIA, PA.  
**PIG, BAR and RAILROAD IRON,**  
**OLD RAILS, SCRAP, &c.**  
Agent for the  
**Mount Savage Fire Brick**  
Eastern Penna., West New Jersey and Delaware.  
**LYNCHBURG IRON CO.,**  
LYNCHBURG, VA.  
Foundry and Forge Pig Iron.  
STORAGE, WHARF and YARD, Delaware Avenue,  
above Callowhill St., connected by track with rail-  
road. CASH ADVANCES MADE ON IRON.

**JAS. G. LINDSAY, THOS. S. PARVIN.**  
**LINDSAY, PARVIN & CO.,**  
328 Walnut St., Phila.  
**Iron and Steel Structural Material**  
FOR ALL PURPOSES.

Estimates furnished for Iron and Steel Structures  
and Railway construction. Correspondence  
solicited with railroad contractors.

**L. & R. WISTER & CO.,**  
**IRON COMMISSION MERCHANTS,**  
257 So. 4th St., Philadelphia.  
AGENTS  
Kemble and Norway Foundry and Forge Pig Iron.  
Wyebrooke C. B. Charcoal Pig Iron. Ferguson  
Red Short Pig Iron.  
DEALERS IN ALL KINDS OF SCRAP IRON.

**MORRIS, WHEELER & CO.,**  
**Iron, Steel and Nails.**  
WAREHOUSE & OFFICES, 16th & Market Sts., PHILA., PA.  
SALES OFFICES, 400 Chestnut St., PHILA., PA.  
New York Address, 14 CLIFF ST.

**ROBT. MOFFLY & CO.**  
Bankers and Brokers, and Wholesale Dealers in  
**SCRAP IRON**  
AND METALS,  
PHILADELPHIA.  
Vard. N. E. Cor. Ninth and Jefferson Streets,  
E. G. JAMES, Manager.  
Bk'g Office, 312 Stock Exchange Pl. Room 4.

**Frank R. Esherick Barclay W. Cotton.**  
**ESHERICK & CO.,**  
263 So. 4th St., PHILADELPHIA  
**Iron and Steel of All Description.**  
Selling Agents for Cleveland City Forge and Iron Co.,  
Forgings; Central Iron and Steel Works, Plates of  
Iron and Steel; Danville Nail and Mfg. Co., Iron and  
Steel Rails, Boiler Tubes; Bridge, Car and Boat  
Specifications a Specialty.

**PEDRO G. SALOM, J. P. L. WESTERSON.**  
**SALOM & WESTERSON,**  
**Philadelphia Testing Laboratory,**  
208 SOUTH FOURTH STREET,  
PHILADELPHIA.  
Analytical and Consulting Chemists, Assayers  
and Metallurgists, Physical Testing.

**NORTH BROTHERS,**  
**Iron Founders,**  
**Light Castings a Specialty.**  
W. Cor. 23d and Race Streets,  
PHILADELPHIA.  
Correspondence solicited.

**PLYMOUTH ROLLING MILL CO.,** Conshohocken, PA.  
MANUFACTURERS OF  
**Pig Iron,**  
Foundry and Forge.  
**Puddled Bars,**  
Special for Axles, Best Neutral and Common.  
Particular attention given to Iron for Special Purposes.

**TESTED CHAINS.**  
**Bradlee & Co., Empire Chain Works,**  
816 Richmond St., Philadelphia.  
Chains for Foundry Cranes and Slings.  
"D. B. G." Special Crane Chain.  
Steel and Iron Dredging, Slope and Mining Chains.  
Ship's Cables and Marine Railway Chains.

**CUMBERLAND NAIL AND IRON CO.,**  
MANUFACTURERS OF  
**"CUMBERLAND" NAILS & WROUGHT IRON PIPE,**  
43 North Water St., and 44 North Delaware Ave., PHILADELPHIA.

**J. Tatnall Lea & Co.,**  
Successors to CABEEN & CO.,  
**IRON COMMISSION MERCHANTS,**  
No. 400 Chestnut Street, Philadelphia.  
BESSEMER, MILL and FOUNDRY PIG IRON, SKELETON IRON, MUCK and SCRAP BARS, NATIVE  
AND FOREIGN ORES. AGENTS FOR CONNELLSVILLE COKE.

**BOOTH, GARRETT & BLAIR,**  
**ANALYTICAL AND CONSULTING CHEMISTS,**  
919 and 921 Chant St. (10th St., above Chestnut St.), Philadelphia, Pa.  
Established in 1836.  
Analysis of Ores, Waters, Metals and Alloys of all kinds. A special department for the  
**ANALYSIS OF IRON AND STEEL,**  
fitted with all the apparatus and appliances for the rapid and accurate analysis of Iron, Steel, Iron  
Ores, Slags, Limestones, Coals, Clays, Fire Sands, &c. Agents for sampling ores in New York and  
Baltimore. Price lists on application.

**JUSTICE COX, JR., CHARLES K. BARNES.**  
Agents for  
Chickies, Conewago, Montgomery and Eureka  
Iron Co., Oxnmoor, Ala.  
**FOUNDRY and FORGE**  
**PIG IRON.**  
CARBON ROLLING MILL CO., Limited, Best Qual-  
ity Muck Bar, CATASAUQUA MFG. CO.'S Bar,  
Angle, Skelp and Sheet Iron.  
No. 224 So. Fourth St., Phila.

**Jerome Keeley & Co.,**  
206 Walnut Place, Phila.,  
Selling Agents for CHARCOAL and ANTHRACITE  
BLOOMS, PIG IRON, BAR IRON, SHEET IRON,  
STEEL and IRON RAILS, IRON CLAD STEEL RAILS  
and BARS, MAGNETIC and HEMATITE IRON ORES,  
FIRE BRICK, COAL and COKE, MUCK BARS, Handle  
Old Iron and Steel Rails, Scrap Iron, &c. Examine  
and negotiate sales of Iron and Coal properties.

**E. H. Wilson, A. Kaiser, J. B. M. Hiron.**  
**E. H. WILSON & CO.,**  
222 and 224 South Third St., Philadelphia.  
BROKERS AND DEALERS IN  
**IRON AND STEEL.**  
Correspondence solicited.

**J. W. HOFFMAN & CO.,**  
**IRON COMMISSION MERCHANTS,**  
208 South Fourth St., Philadelphia.  
Selling Agents PINE IRON WORKS, Pine Brand  
Plates; GLASSGOW IRON CO., Plates and Muck Bars;  
SPRING STEEL & IRON CO. (Limited), Siemens-  
Martin (Open Hearth) Steel, Universal and Sheared  
Plates, Angles and Shapes.

**JNO. L. HOGAN,**  
**IRON COMMISSION MERCHANT,**  
216 SOUTH FOURTH ST., PHILA.  
**Pig Iron & Ores, Steel & Iron Blooms.**  
Agent for Brier Hill Iron and Coal Co.,  
Youngstown Steel Co., Open Hearth Metal,  
Charcoal Iron, Connelville Coke,  
Old Rails, Scrap, &c.

**FOR BEST HILL**  
**ANDOVER PIG IRON**  
Products.  
Andover Chill Iron  
for Carwheels, &c.  
Each Pig marked exact chill depth (3/4 in. to 1/2 in.).  
A. Whitney & Sons' standard test.  
F. A. COMLY, Treas.  
J. WESLEY FULLMAN, Agent. 240 So. 3d St., Phila.

**J. J. MOHR,**  
430 WALNUT ST., PHILA., PA.  
SOLE AGENT FOR  
Sheridan, Leesport, Temple, Lynch-  
burg, Millcreek and Mt. Laurel  
**FOUNDRY PIG IRON** and Forge  
**CHARCOAL PIG IRON.**  
Also Woodbridge Clay Mining Co.'s Fire Brick.

**Established 1847.**  
**A. WHITNEY & SONS,**  
**CAR WHEEL WORKS,**  
PHILADELPHIA.  
Special Wheels for Furnace and Mine Cars.

(Concluded from page 1.)  
has set in and been followed up to an abnor-  
mal degree, and as soon as prosperity ceased  
temporarily the foreign mechanic or laborer  
has remained at home. This constant arti-  
ficial augmentation of the number of labor-  
ers during prosperous years has had its full  
share in bringing in the following period of  
depression.

"It is undoubtedly true that during the  
past 50 years immigration has been of ines-  
timable value as an element in American  
industrial progress, but it cannot be said  
now, and probably not to any great extent  
in the future, that America is the home of  
the oppressed of all nations. This advertise-  
ment will undoubtedly be withdrawn, as  
well as that other that there is room enough  
in the United States for all."

Considering suggested remedies for de-  
pressions the commissioner says, among  
other things:  
"Halt shall be made in freely grant-  
ing lands to corporations, for, however  
valuable such grants may be to the public  
interest in developing great lines of railways,  
the result is that the lands constitute a basis  
to a greater or less extent for speculative  
purposes. Legitimate voluntary immigra-  
tion may be too rapid to enable a country  
developing its industries to assimilate labor  
from the outside; but when immigration  
becomes a subject of inducement of contract  
for the purpose of displacing a higher grade  
of labor the result is indeed pernicious, and  
all the authority of law should be called in to  
prevent the continuance of the wrong."

"The effect that the enactment of laws to  
stop speculation would have, if they could  
be specifically applied, would be for the  
public good. It might be well to enact  
laws allowing no organization to put its  
stock upon the market without the full  
value of its capital stock is paid in, either  
in the currency of the country or in abso-  
lute property. Many corporations are or-  
ganized for the purpose of floating stock,  
and with a glowing prospectus the stock is  
floated. Under this head, too, would come  
the question of corners and trading in  
futures."

"It cannot be denied that both inflation  
and contraction disturb values, and thereby  
disturb industry, and certainly a sound cur-  
rency is demanded by labor in order that  
the laborer may know the value of his earn-  
ings at all times, and it is demanded by the  
producer that he may calculate with reason-  
able accuracy the cost of production. Re-  
form in the methods of distributing supplies  
would, if rightly directed, bring great relief  
to consumers. Co-operation in its distribu-  
tive form is suggested as a remedy in this  
respect; but co-operative distribution is only  
a half measure, because this method is or-  
ganized, economized and made effective for  
consumers almost entirely, and producers as  
such are not materially benefited."

**The Russian Petroleum Trade.**  
The St. Petersburg correspondent of the  
London Ironmonger of recent date writes:  
The statistics of the naphtha trade of  
Baku for the year 1885 are now published.  
The total quantity of raw naphtha pumped or  
received from the wells has been 105,000,000  
poods, or nearly 2,000,000 tons—in other  
words, 400,000,000 gallons. Prices have ruled  
about 2/ per 100 gallons of raw naphtha, or  
1/4 d. per gallon. Out of this large quantity  
27,000,000 poods, or nearly 500,000 tons, of  
kerosene have been distilled and dispatched  
from Baku. The largest portion, two-  
thirds at least, has been sent off by sea to  
Astrakan, and thence up the Volga to Tzar-  
itzin, Kazan, Nijni, Rybinsk, to be forwarded  
by cistern wagons for distribution to all  
parts of Russia, and to Baltic ports, thence  
to Germany and England. The oil is sent  
everywhere in bulk, no casks being used ex-  
cept to foreign ports, and even now London  
will be supplied by cistern vessels carrying  
in bulk. About 7,250,000 poods have been  
shipped over Batoum, on the Black Sea,  
going thence to the Danube to Odessa, Mar-  
seilles, and some by the Suez Canal. Every  
day now large trains of cistern wagons leave  
Baku via Tiflis for Batoum, and much talk  
goes on with a view to putting down pipes  
for the transit across the Caucasus.

There has been a very fair quantity sent  
across the Caspian to Michaelofsky, to be  
sent on by the railway thence to such cen-  
ters as Merv, Tashkend, Khiva, Samarcand,  
&c. Baku kerosene is selling at Merv at  
6 s. r. pood, equal to 12/, or, say, 3/ per  
gallon, the demand increasing. The naphtha  
found in the steppes around is being utilized  
for the locomotives and for fuel. The Nobel  
Co., who have just published a notice of  
their annual meeting, intimate to shareholders  
that all the reports about their position,  
&c., are false, and that their trade is fast  
extending. They will no doubt be doing a  
large trade beyond the Amu Daria and in  
Afghanistan before 1886 has expired. The  
company have now 27 wells in the Baku  
district, all of which have been fitted up  
with every convenience on the best Ameri-  
can system, having the supply well under  
control, for wild floodings and overflows are  
no longer allowed, the supply being regulated  
by the demand.

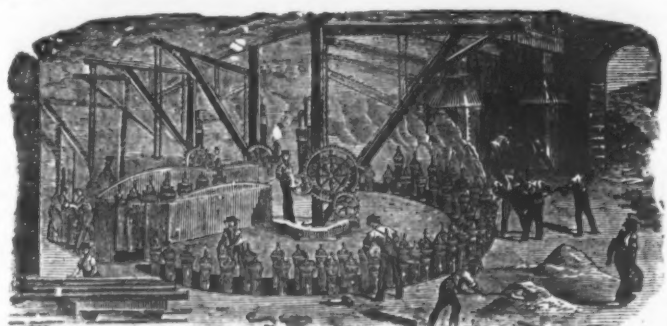
S. E. Jerals and E. R. Lawton, of  
Cheshire, Conn., are the patentees of a  
handle for cutlery formed by a new process.  
A blank with tapering sides and circular end  
projections is struck up from a sheet of  
metal. This blank is bent into tubular form  
of circular or oval outline in such a manner  
that the edges may be united by brazing or  
soldering. After the edges are united the  
end projections are bent inward and the  
butt end is closed to finish the handle. The  
advantage claimed for this process is that  
the rounded or oval end of the handle may  
be formed without the use of a mandrel.  
This is of importance in making tapering  
handles, inasmuch as a mandrel cannot be  
applied in the final operation of closing the  
end. The curved shape of the edges causes  
them to meet in such a manner as to fill out  
and round out the handle end into the mor-  
tise of the finishing dies.

The roll turners are beginning to organize  
as one of the lodges of the Amalgamated  
Association.



A. H. McNEAL,  
BURLINGTON, NEW JERSEY.

FLANGE PIPES.



General Foundry Work.

**CAST IRON PIPES**  
FOR WATER AND GAS.

ESTABLISHED IN 1848.

**SINGER, NIMICK & CO., Ltd.,**  
PITTSBURGH, PA.,

MANUFACTURERS OF ALL KINDS OF

HAMMERED AND ROLLED

**STEEL,**

WARRANTED EQUAL TO ANY PRODUCED.

**BEST REFINED TOOL CAST STEEL**

For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives,  
Cold-Chisels and Machinists' Tools generally.

**SAW PLATES**

For Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

**Sheet Steel**

For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws,  
Stamping Cold, &c., &c.

**SIEMENS-MARTIN (Open-Hearth) PLATE STEEL**

For Boilers, Fire Boxes, Smoke-Stacks, Tanks, &c.

All our Plate and Sheet Steel being rolled by a Patented Improvement, is unequalled for  
surface finish and exactness of gauge.

**ROUND MACHINERY CAST STEEL**

For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.;  
Cast and German Spring and Plow Steel.

"Iron Center" Cast Plow Steel.  
"Soft Steel Center" Cast Plow Steel.  
"Solid Steel Center" Cast Plow Steel.

Finished Rolling Plow Coulters, with Patent Screw Hubs  
Agricultural Steel cut to any pattern desired. [attached].  
Steel Forgings made to order.

Represented at 243 Pearl and 18 Cliff Sts., New York, by

**HOGAN & SON,** General Agents for Eastern and New England States.

HOGAN & MCGARGO, 417 Commerce St., Philadelphia, and FULLER, DANA & FITZ, 110 North St., Boston.



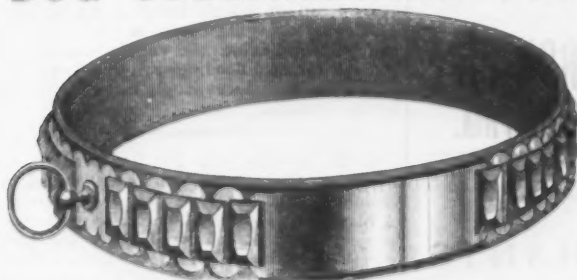
**FRANKFORD STEEL COMPANY,**  
FRANKFORD, PHILA. PA.,

**STEEL RAILROAD AND MACHINE FORGINGS,**

'SOLID CRUCIBLE STEEL CASTINGS'

Best Grades of Tool and Machinery Steel.

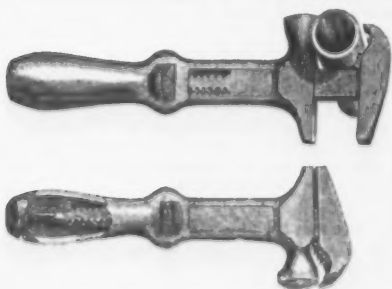
**DOG COLLARS AND FURNISHINGS.**



We are the only firm in  
the world that make the  
manufacture of Dog Col-  
lars and Furnishings their  
exclusive business, and as  
such guarantee goods and  
prices. Send for our il-  
lustrated catalogue.

**MEDFORD FANCY**  
GOODS CO.,  
707 Broadway, N. Y.

**BOARDMAN'S PATENT COMBINATION WRENCH.**



The Most Popular Combination  
Tool in the Trade.

Made in the most Thorough Manner, of the  
Best Material and Finish,

By **TOWER & LYON.**

96 Chambers Street,  
NEW YORK.

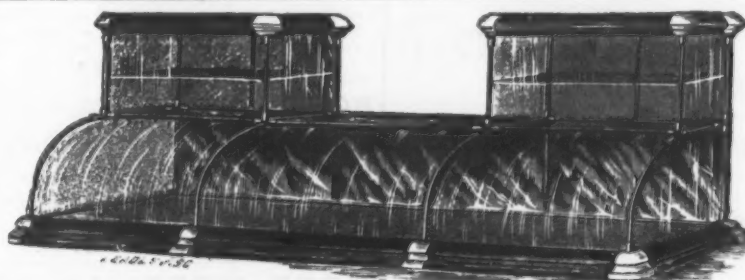
Established 1861.  
**THOMAS C. BURROWS,**  
Agent for Jersey City Steel Company,  
Successors to JAS. R. THOMPSON & Co.,  
**STEEL** Of All Descriptions.  
WAREHOUSE, 99 and 101 JOHN ST., NEW YORK.

**SANDERSON BROS. STEEL CO.,**  
SYRACUSE, N. Y.,  
MANUFACTURERS OF THE CELEBRATED

**Sanderson Bros. & Co.'s**  
**Fine Cast Steel**

FOR TOOLS, DIES AND ROCK DRILLS.

Branch Warehouse: 39 Fort Hill Square, Boston.



**FARLEY & HOFMAN,**

ROCHESTER SHOW CASE WORKS,

Manufacturers of **SHOW CASES** of every description. Highly finished wood cases with pat-  
ent bell-metal joints a specialty, and the best in the world. Branch stores, 39 and 41 West Broadway,  
New York; 95 Sudbury St., Boston, Mass. Catalogues sent on application. Mention *The Iron Age*.



**LOCOMOTIVE AND CAR-WHEEL TIRES**

Manufactured from the celebrated OTIS STEEL BRAND

**STANDARD**

Quality and efficiency fully guaranteed. Prices as low  
as any of the same quality. We manufacture Heavy and  
Light Forgings, Driving and Car Axles, Crank Pins, Piston  
Rods, &c.

**THE STANDARD STEEL WORKS,**

WORKS AT LEWISTOWN, PA.

Office, 220 S. 4th St., Philadelphia, Pa.

INDESTRUCTIBLE

**Furnace Lamp,**

MADE BY

**TAYLOR & BOGGIS**

FDY. CO.,

Cleveland, - Ohio.

2 Sizes 3 Pint and 2 Pint.

It has no Seams or Solder in  
Its Construction.



**NEW ENGLAND SPECIALTY CO.**

North Easton, Mass.,



MANUFACTURERS OF

**LEAVITT'S IMPROVED SCREW DRIVERS,**

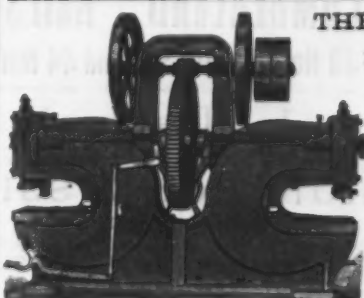
With Barbed Tang. (Patent applied for.)

**LEAVITT'S PATENT COMMON SENSE CAN OPENER.**

Patented Novelties and Hardware Specialties.

**SHEET METAL PUNCHING TO ORDER.**

*The Alford & Berkele Co., Agents, 77 Chambers St., New York.*



**THE LONG & ALLSTATTER CO.,**

HAMILTON, OHIO: COR. 4th AND HIGH STS.,

**PUNCHES,**

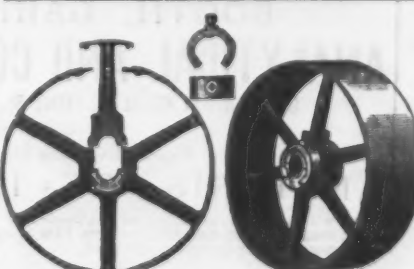
**SHEARS**

**AND**

**HAMMERS.**

Double, Single, Hor-  
izontal, Twin Boiler,  
Spacing Gate, Multiple  
Angle, Bar, &c. Belt  
and Steam Driven.

Send for Catalogue.



**THE**  
**Cross Divided Pulley.**

in all sizes, from 6 inches up to 36 inches,  
with any width of face required.

**THE ADVANTAGES**

are numerous and important.

SEND FOR DESCRIPTIVE CIRCULAR.

*The Gaylord, Cross & Speirs Co.,*  
WATERBURY, CONN.

WROUGHT IRON

**BOILER TUBES.**

Steam, Gas and Water Pipe, Oil  
Well Tubing, Casing

AND

**LINE PIPE.**

*Cotton Presses, Forgings, Rolling  
Mill and General Machinery.*

**READING IRON WORKS,**

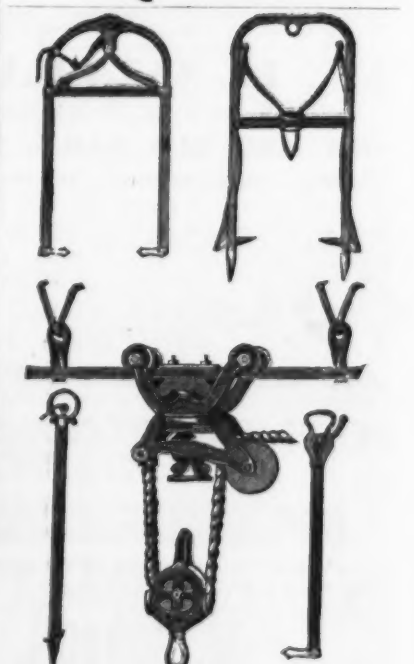
261 S. Fourth St., Philadelphia.



FRANKLIN S. MILES,  
Manufacturer of

Iron, Steel and German Silver

SCREWS,  
205 Quarry St., Philadelphia.



**THE NEY MFG. CO., Canton, Ohio,**

MANUFACTURERS OF

Horse Hay Forks, Elevators, Patent Steel Hay  
Elevator Tracks, Floor Hooks, Hay Fork Pul-  
leys, American Sickle-Edge Hay Knife.

CATALOGUES TO BE HAD ON APPLICATION.



**MITRE BOXES.**

**OLMSTED'S IMPROVED**  
Has adjustable iron saw guide for any thickness of  
saw blade. The saw cannot cut the frame away.  
They are perfectly true and reliable.

List Price, \$12.00 Per Dozen.

**L. H. OLMSTED, Corona, N. J.**

**TYRONE IRON CO.,**

Works at Tyrone Forges, Blair Co., Penn.

**BEST CHARCOAL BLOOMS**  
and **BOILER TUBE SKELP.**

ALSO TACK AND NAIL PLATE.

Blooms guaranteed and especially adapted  
for stamped ware.

**Samson Cordage Works**

Solid Braided Window Sash Cord.  
The most durable and economical.  
Send for Samples to the Man-  
ufacturers.

**J. P. TOLMAN & CO.,**

Cor. High and Hamilton Sts. Boston, Mass.

**GEO. M. EDDY & CO.,**  
Manufacturers of

**Measuring Tapes**

of Cotton, Linen and Steel.

FOR ALL PURPOSES.

351 to 353 Nassau Ave. Brooklyn, N. Y.



**SILVER & DEMING MANUFACTURING CO.**Salem, Ohio, U. S. A.,  
MANUFACTURERS OF  
CISTERN, PITCHER, WELL and  
FORCE**PUMPS**Wind Mill Pumps, Hand  
and Power Rotary  
Pumps,  
**HYDRAULIC RAMS,**  
Boiler Feed Pumps, Gar-  
den Engines, &c.  
Also Carriage Makers' Tools,  
Blacksmiths' Drills, Butchers'  
Tools, and Feed Cutters.

Write for Catalogue and Prices.

English Bros., Kansas City, Mo.,  
GENERAL WESTERN AGENTS.European Agency with SELIG, SONNENTHAL & CO.,  
London E. C., England.  
PANCOAST & MAULE, Phila., Pa., Eastern Agents.**JOHN MAXWELL,**

MANUFACTURER OF PATENTED

**BRASS, BRIGHT  
TINNED WIRE  
& JAPANNED****BIRD  
CAGES.**The cheapest and  
most saleable in  
market.  
Catalogues and  
Price Lists furnished  
to be Trade.247 & 249 Pearl St.,  
New York.

Pat. size of Band for Brass and Tinned Wire Cages.

**DUNBAR BROS.,**

Manufacturers of

**Clock Springs and Small Springs**  
of every description, from best Cast Steel.  
**BRISTOL, CONN.****FIELD'S**

IMPROVED

**FORCE PUMPS.**Latest, Cheapest  
and Best.Household, Orchard  
and WellForce Pumps,  
Flicker Pumps,  
Tute Well Pumps.**ECONOMY**

Garden Engine.

Send for Catalogue.

**Field Force Pump Co.,**  
Lockport, N. Y.New England Agency with Fuller, Dana & Fitz,  
Boston, Mass.  
Western Agency with The Temple Pump Co.,  
Chicago, Ill.  
Florida Agency with Geo. F. Drew & Co., Jack-  
sonville, Fla.**GUN POWDER.****LAFLIN & RAND POWDER CO.,**

No. 29 Murray Street, New York.

Manufacture and sell the following celebrated brands  
of Sporting Powder, known everywhere as**Orange Lightning, Orange Ducking,  
Orange Rifle,**  
more popular than any powder now in use.**BLASTING POWDER and ELECTRICAL BLASTING  
APPARATUS. MILITARY POWDER** on  
hand and made to order.Safety Fuse, Frictional and Platinum Fuses.  
Pamphlets showing sizes of grain sent free.**"FLORENCE"****LAMP STOVE.**Well Advertised,  
Sells Quick and  
Pleases Everybody.

Why not try them?

**The ALFORD &  
BERKELE CO.,**

Selling Agents,

77 Chambers St., New York.

Pat. Nov. 14, 1878, &amp; July 11, 1880. Others Pending.

**NEW MAKE OF MINE LAMP.**THREE DIFFERENT  
SIZES  
SPOTSSEND  
15 CENTS  
FOR SAMPLE  
TO**LEONARD BROS., Scranton, Pa.**SCALP  
COLLAR  
BRASS HINGE  
Solid Lid  
NO SOLDERING  
THE HINGE  
CANNOT  
MELT OFF**PATENTS**

AND PATENT SUITS.

Please send for Circular to

**THOMAS D. STETSON,**

38 Murray St., New York.

**W. & B. DOUGLAS,**

MIDDLETOWN, CONN.,

The Oldest and Most Extensive Manufacturers of

**PUMPS, HYDRAULIC RAMS, GARDEN ENGINES.**Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill  
Pumps and other Hydraulic Machines in the World.

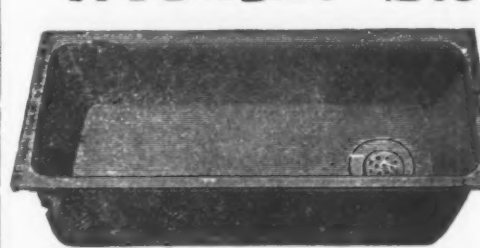
FIG. 120.



FIG. 109.



FIG. 70.

**Wrought Steel Sinks.**One of the strong points of these sinks is the new coupling with which they are now supplied  
and which is pronounced by all plumbers the best on the market. It is used with both lead  
and wrought-iron pipe; is a neat, reliable coupling, and is easily detached for the purpose of pumping  
out the pipe. The strainer and all parts of the coupling are tinned, and are furnished with all sinks  
without extra charge.The fact of the great strength and durability of this sink, as it is practically free from danger of  
breakage in transportation, handling or use, is a strong point in its favor, and that its merits are  
recognized by most competent judges is evident from the fact that leading houses which have been  
interested in the common article have taken up the Wrought Steel Sink. Twenty-five per cent is  
saved in freight by purchasing Steel Sinks. Orders come from all parts of the United States, Canada,  
Europe and Australia.**BRANCH WAREHOUSES:**

85 and 87 JOHN STREET NEW YORK, and 197 LAKE STREET, CHICAGO, ILL.

**UNION MANUFACTURING CO.**

Sole Manufacturers of

**SKINNER'S PATENT  
COMBINATION CHUCK.**

Universal, Independent and Eccentric.

By sliding a stud on the back of Chuck it is in  
stantly changed from Universal to Independent, and  
vice versa. Each Chuck is guaranteed perfect. All  
parts are made interchangeable. Only the very best  
materials used in their construction. Reverse of  
special Jaws furnished when desired. We also manufacturePlain and Ornamental Butts.  
Single and Double Acting Spring Hinges,  
Union Coil Door Springs,  
Galvanized Pump Chain,  
Patent Rubber Buckets,  
Wooden Well Curbs, Wood Tubing,  
Iron and Brass Pumps,  
Patent Copper Pumps,  
Hydraulic Rams, Power Pumps,  
&c., &c., &c.

Write us for prices.

**UNION MANUFACTURING CO.,**

NEW BRITAIN, CONN.

WAREHOUSES: 103 Chambers Street, New York, and 164 Lake Street, Chicago.

GEORGE BROOKE, President.

GEO. W. HARRISON, Treasurer.

**THE E. & G. BROOKE IRON CO.,**

BIRDSBORO, BERKS CO., PA.,

MANUFACTURERS OF

**ANCHOR NAILS AND SPIKES. BRAND**

Capacity, 1000 Nails per Day.

Made from their own Pig Iron, Insuring Regularity and Superiority in Quality.

ALSO

**FOUNDRIY AND FORGE PIG IRON,  
AND COLD BLAST CHARCOAL CAR WHEEL IRON.****OLD DOMINION  
CUT NAILS, BAR IRON.**

R. E. BLANKENSHIP, President,

RICHMOND, VA.

**IRON AND STEEL DROP FORGINGS**All shapes, small and large, including  
GUN, PISTOL, WRENCH BARS, &c. ALSO, DIE SINKING. MANUFACTURERS ALSO  
OF BRICKLAYERS', MOULDERS' AND PLASTERERS' TOOLS,  
SADDLERS' ROUND AND HEAD KNIVES.**WILLIAM ROSE & BROS.,**

36th &amp; Filbert Sts., WEST PHILADELPHIA.

**NATIONAL HARDWARE & MALLEABLE IRON WORKS**

Lehigh Avenue, American and Third Streets, Philadelphia.

**THOMAS DEVLIN & CO.,**MALLEABLE, FINE GRAY IRON AND STEEL CASTINGS made from patterns to  
order. Special attention given to Tinning, Bronzing, Coppering, Japanning and Fitting. A large line  
of Carriage and Wagon Castings constantly on hand for the trade.**EMPIRE STATE MFG. CO., 37 Washington St., BUFFALO, N. Y.**

BIXBY &amp; DRULLMAN, PROPRIETORS,

**HARDWARE SPECIALTIES,****SPUN COPPER AND HALF COPPER TEA KETTLES**MOULDERS' TOOLS, AWLS, COUNTER PEG FLOATS, CRIMP MACHINES,  
METAL SPINNING AND NICKEL PLATING.  
SEND FOR CATALOGUE.**Reconstructed Blast Furnaces, Shelby,  
Alabama.**

The first blast furnace for the manufacture of pig iron erected in the State of Alabama is stated to have been built by John McClenahan, near the site of the present Shelby Iron Works, in 1830 or thereabouts. He also ran a forge on a creek near by. It probably had a capacity of 2 tons per day, and its product was made into hollow-ware and castings generally needed in the country. In 1841 McClenahan sold the property to Horace Ware, who put up a larger furnace, having by 1860 reached a capacity of 6 tons per day. He had the old-style wooden cylinders, but they were driven by steam. He also erected a small rolling mill with one puddling furnace, and in 1868 admitted that he was making \$300 per day. His chief manufacture was cotton-ties, for which he took pay in gold or cotton, though Confederate money was about par at that time. In the latter part of 1862 John McClenahan, James W. Lapsley, J. R. Keenan, John W. Lapsley, Andrew T. Jones and H. H. Ware bought six sevenths interest for \$150,000, and formed the Shelby Iron Works Co. A new furnace was erected and the rolling mill greatly enlarged. The average capacity of this stack was 12 tons, though occasionally 15 tons were made. This establishment was actively worked until April, 1865, when the whole perishable part was burned by General Wilson. In 1870, when the writer first visited the place, the site of the rolling mill was one of the most confused masses of shafting, pulleys and machinery that could be imagined. It is said that there were on hand for repairs and alterations over 30 steam engines of all characters, grades and styles, which has been gathered up or confiscated all over the South.

In 1868 the old company was revived, an arrangement having been made with Northern capitalists whereby they were to put in money for repairs, &c., against the property, thus to become one-half owners in a new company. Like most such arrangements, it has not worked harmoniously, and at this time, with one exception, all the Southern owners of the property have sold out at a handsome profit. The old stack was run one blast, making about 12 tons, per day, when in 1870 a new life dawned on the whole establishment by the arrival of Walter Crafts as superintendent. Mr. Crafts was probably in all respects the most accomplished furnaceman that has ever come to the South. With a thorough scientific knowledge of the business, he possessed the ability of adapting that science to practice, and he also had in an eminent degree all the qualities of firmness and policy necessary in dealing with men, especially in the South at that time. One of his first acts was to raise the stack from 42 to 56 feet in height. This he did by putting on top of the brick stack an iron shell, lined; he also changed the shape. This was a bold step, and all the old knowing charcoal men predicted disaster. The exact reverse was the result. From 12 tons per day the average ran up to 20 tons, and one week during a visit of the writer in 1871 the furnace made an average week's run of 210 tons on 90 bushels of charcoal to the ton. This blast lasted for three years nine months and fifteen days, and 19,358 tons of iron were made.

No. 2 furnace was built in 1872-73, but not put in blast until 1875. It is a modern-style furnace in every respect, and was built in the most thorough manner under Mr. Crafts' personal supervision. Mr. Crafts left Shelby in 1873 for the Hocking Valley, and was succeeded by his former assistant, Col. J. F. Black. Mr. Crafts, however, being really consulting manager and directing much of the work until April, 1883, when Mr. McArthur was elected superintendent. This gentleman died in 1885 and was succeeded by the present superintendent, Col. H. R. Stoughton. The present officers are Newton Case, Hartford, Conn., president and treasurer; J. A. Pickett, vice president; O. D. Case, secretary; H. R. Stoughton, general manager; E. P. Cowles, assistant treasurer; E. T. Witherby, assistant secretary. Mr. Witherby has been with the company since 1870.

The furnaces as at present constructed and running are as follows: No. 1, total height, 56 feet; bosh, 20 feet high, 12 feet greatest diameter; hearth, 3 feet high, 6 feet diameter. No. 2, total height, 60 feet; bosh, 23 feet high, 14 feet diameter; hearth, 4 feet high, 7 feet diameter. Both are run with seven tuyeres 3 inches in diameter. The tuyeres are the plain composition tank tuyeres made in the company's foundry; no coil. No. 3 has a tank water-jacket up to the mantel, and No. 1 has a coal-jacket up to top of hearth, 3 feet.

The blast is furnished by three engines—No. 1, 60 inches diameter, 54 inches stroke; Nos. 2 and 3, 84 inches diameter, 48 inches stroke. No. 2 was made by Webster, of Chattanooga, and is a first-class engine. The engineer told me that it had not cost \$100 for repairs since it was put up in 1873. No. 3 is from Mackintosh, Hemphill & Co., of Pittsburgh. The engineer stated that the only advantage of this over No. 2 was that it could be run at higher speed. The blast for No. 1 furnace is heated in a stove containing 84 ox-bow pipes, oval in shape and so arranged that the blast goes in all at once, thus making less strain on the engine, and any one of the sections can be shut off. It is a good stove, but I could not learn whose special pattern. It was put in by Mr. McArthur. The hot blast of No. 2 has 72 pipes of the ordinary ox-bow pattern. Both stacks are so arranged by valves as to be run on hot or cold blast.

No. 1 was put out of blast January 17, 1886, and by February 17, 1886, just one month, had been relined and received a new hearth, and on the 18th fire was put in for drying out. This stack did not do well during the last blast, running only 35 weeks and making 6600 tons of iron. During the past 40 weeks, to February 20, No. 2 had made 9537 tons. The consumption of charcoal ranges from 100 to 125 bushels to the ton of pig; 2 tons of roasted ore make 1 ton of pig. The iron made is graded 1, 2, 3, 4, 5, 6 and 7. Nos. 1 and 2 do not chill. No. 3 chills 1/4 inch. No. 4 to 1/2 inch, No. 5 to 1 inch, No. 6 is mottled, No. 7 white. The whole equipment of the furnaces is well arranged and their

management is under charge of Mr. J. P. Christian, who has been at Shelby continuously for 20 years.

The bed from which the ore is obtained is immediately at the furnaces, part of the hill having been dug away for the old brick stack of No. 1. In this hill, from valley to valley all around, is 160 acres. The records show that there have been taken out of it and used 302,000 tons of roasted ore, while during and previous to the war fully 150,000 tons more were taken out, yet not over 20 acres have been dug into. The deepest working is 30 feet, and that only at one point, while all the bottom is still ore, and large quantities show in the sides of the cuts. This hill is 100 feet above water level of the valleys, and, as limestone has only been reached in those valleys at a depth of 60 feet, there is certainly a vast body of ore above water level and possibility of much more below. The number of men at work in and around the mine, washer, &c., is from 95 to 100, and for the week ending February 20 the product of raw ore averaged 350 tons per day. The manager was not disposed to tell the cost of his ore, but the men are paid 80 to 90 cents a day, and assuming the average output of the mine per day for a year to be 100 tons, then the cost per ton of raw ore would be 80 cents. But the wages of the diggers, washers and carters should be charged to raw ore. However, as the loss in washing, roasting and screening is about 20 to 25 per cent, it is safe to say that the roasted ore costs about \$1 per ton delivered at the furnace.

The screening is done by machinery, cams giving an up-and-down motion to the sifter or screen, and an eccentric the side movement. The washer is a patent apparatus of costly make. Everything except the dirt from the pits is moved by little locomotives, of which there are four. It is Colonel Stoughton's intention to put them also in the mine and in every possible place where they can be used instead of mules. The charcoal used is obtained from various sources. "We are now following the saw-mills," said Colonel Stoughton. Most of it is now bought delivered at the furnace at 6 1/2 cents per bushel. The company own, however, at various points in the woods, 300 conical kilns for making charcoal.

The limestone is obtained from a quarry 4 miles east of the furnaces, where new machinery has just been erected for crushing and loading. The carload of stone, just 1 ton, is drawn out of the pit up an incline and dumped into a hopper, from which it feeds itself into a Gates crusher. The capacity of this machine is said to be 1 ton in five minutes. The whole arrangement is very perfect, and the stone is not handled from the time it leaves the quarry until it is ready to go into the stack. About 18 per cent of lime is used to the ton of iron made.

The ore bed is one of the great deposits of the South, and it is impossible to tell how many tons of ore can be taken from it. Besides it the company own another of 40 to 50 acres near by, and two more some distance off on the railroad. The analyses of the ore show it to be very low in phosphorus.

To bring in wood, coal and limestone the company own 12 miles of railroad, 4-foot gauge, running east to the Coosa River, and 6 miles, regular gauge, out to the East Tennessee, Virginia and Georgia Railroad at Columbiana. They also own a large foundry, and machine, car and carpenter shops, a neat, well kept hotel, a large well arranged storehouse and numerous well-built houses. There are two churches, one of brick for whites, common to all denominations; the other frame for colored. There are also two schools; the one for whites is called the Case Institute, with an attendance of 60 scholars, while the colored school has an attendance of 96. It is taught by a graduate of Fisk University. By law of the State no liquor can be sold in Shelby County; hence the works are free from that curse. The company employ about 400 hands in all their works, a large proportion of whom are colored, and the monthly pay-roll amounts to an average of about \$10,000 per month. Thus at least 2500 persons, big and little, are fed and clothed and \$1,200,000 distributed annually. The capital within a small fraction comes from Hartford.

I cannot close this report without mentioning a department well worthy of being copied at many other furnaces. The company own what Colonel Stoughton calls "the ranch;" it is simply a large well cultivated, well-managed farm. The man who attends to it has also charge of the market at the works. Cattle and sheep are bought and fattened, then butchered. All the manure from the various stables is carried to this farm, and vegetables are grown, as well as grass and other feed for stock. Thus the operatives are supplied with good meat and fresh vegetables at comparatively cheap rates.

H. E. C.

**Armored Turrets for Fortifications.**

The experiments now nearly completed at Bucharest, says the *London Times*, possess an interest and importance beyond their mere technical scope. General Brialmont, the author of numerous works on fortification, was asked to submit a project of defense. Several forts have been already commenced in accordance with his designs, forming the first link in the chain with which it is proposed to surround Bucharest. The important question of armament remains in abeyance; but, General Brialmont having a predilection in favor of armored turrets, it was determined to carry out exhaustive experiments with two structures supplied by Messrs. Gruson, of Buchan, and the St. Chamond Iron Works respectively. Having decided on an experimental expenditure of some 900,000 francs, the Roumanian Government threw open their practice ground to the representatives of the powers, and the motley crowd of strange uniforms excited some interest in Bucharest, where the people were at first inclined to classify the wearers generally as "Bulgars." Though the programme of the experiments was a long one, much still remains to be carried out, and the general results will probably be incomplete till the spring.

The two turrets are quite dissimilar in principle and design. The French is cylindrical in form, exactly like those carried on board numerous ships of war. The armored



Paris, 1878. **McCAFFREY & BRO.,** For Superiority.  
PENNSYLVANIA FILE WORKS,  
Philadelphia, Pa., U. S.

Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

**GAY & PARSONS,**

MANUFACTURERS OF THE

**Double-Action Ratchet Screw Driver.**

ONE OF THE VERY BEST TOOLS EVER INVENTED.



The above Cut shows the action or mechanism complete, also an end view of the Ratchet and Pawls, to which we wish particularly to call your attention, as in all ratchet movements, of whatever kind or nature, the **RATCHET** must be the principal and most important part employed.

It combines greater Strength,

Convenience and Durability than can be obtained in a common Driver.

FOR CIRCULARS AND PRICES, ADDRESS OUR AGENTS,

**JOHN H. GRAHAM & CO.,**

113 Chambers Street, NEW YORK.

**IRON ROOFING**  
SIDING, CEILING, ARCHES AND LATH.  
**CINCINNATI CORRUGATING CO.**  
CINCINNATI, O.  
SEND FOR ILLUSTRATED CATALOGUE.

**LIGHTNING HAY KNIVES. WEYMOUTH'S PATENT.**



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bales, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 40 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

**HIRAM HOLT & CO., East Wilton, Franklin Co., Maine**

For sale by the Hardware trade generally.

**CAUTION:**

We are informed that various parties are infringing upon the widely known Letters Patent granted originally to George F. Weymouth, for an improved Hay Knife.

The characteristic feature of the invention is a curved blade, provided with saw-tooth cutters, and furnished with suitable working handles. It is our purpose to prosecute all infringers of our patent, and we have already commenced one suit, which is nearly ready for hearing, and are about commencing suits against other parties.

All manufacturers are hereby warned of our rights, and the public are cautioned against purchasing any Hay "Saw Knives" which are not of our genuine manufacture.

**HIRAM HOLT & CO.**

EAST WILTON, May 26, 1884.

**TACKS AND STAPLES**  
A COMPLETE LINE OF  
Double Pointed and Steel Wire Tacks, Blind, Red Spring, Telephone and other Staples.  
The Large Head 1 1/2 x 1 1/2, Full Weight.  
Steel Wire Tacks, Uniform, Dbl. Uniform  
are put up either in Assorted iron papers.  
Outside of all Combinations.  
Send for Catalogue.

**RIPLEY & BARTLETT, TACKS**

Swedes and American Iron Tacks of All Kinds.

Having lately withdrawn from the combination, we are at liberty to make such terms and prices as we think expedient. Quality guaranteed the best in the market. Any variation from regular sizes and shapes made to order from samples.

WORKS AT  
**PLYMOUTH, MASS.**

**TACKS & WIRE NAILS**

BOSTON SALESROOM,  
70 Portland St.

BALTIMORE SALESROOM,  
73 German St.

NEW YORK SALESROOM,  
116 Chambers St.

**AMERICAN TACK CO., Fairhaven, Mass.**

**Nicholson  
FILES.**

BEWARE OF IMITATIONS.



Inferior Goods are never Imitated.

Each box of our "Double Enders" has an End Label like this, except that it is printed



on green paper; and one of our large green labels will be found on the top of each box.

The favor with which our Invention has been received has led to various imitations, and buyers should exercise care or an inferior article may be imposed upon them.

**NICHOLSON  
FILE CO.,**

PROVIDENCE, R. I.,

Sole Manufacturers.

**BLACK DIAMOND FILE WORKS.**



**G. & H. BARNETT,**  
21 to 43 RICHMOND STREET, - - - PHILADELPHIA.

**CHARLES B. PAUL, MANUFACTURER OF HAND CUT FILES,**

Warranted Cast Steel.

187 Tenth St., Williamsburgh, N. Y.

All descriptions of Files made to order. Price List mailed on application.

Established 1863.

**THRIFT FILE WORKS,**  
Manufacturers of all kinds of  
**FILES, RASPS.**



**CHRISTIAN HENSLER,**  
438, 439, 442 & 444 Ireland St., PHILA., PA.  
HERRING & SWEASEY, Agents in New York, 102 Chambers St.

**McClellan  
File Co.,**

113 So. Water St.,

E. Saginaw, Mich.

**TACK AND SHOE NAIL  
MACHINERY:**  
WM. A. SWEETSER  
Brockton, Mass.

**HELLER & BROS.,**  
NEWARK, N. J.,



MANUFACTURERS OF THE

CELEBRATED AMERICAN HORSE RASPS, FILES, FARRIERS' TOOLS AND FINE CAST STEEL.

Made of solid best CLAY CRUCIBLE CAST STEEL of our own manufacture and warranted to be unequalled in the market. For sale by Iron and Hardware dealers throughout the United States and Canada.



**J. M. KING & CO.,**  
WATERFORD, N. Y.

Manufacturers of the

**Button's Pat. Wire Cutter and Plier Combined.**

Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and MACHINISTS' STOCKS and DIES, PLUG and TAPER TAPS, HAND, NUT and SCREW TAPS, PIPE TAPS and REAMERS.

Price List on Application.

Established by DANIEL B. KING, 1899.

**LIGGETT SPRING AND AXLE CO., LIMITED,**  
MANUFACTURERS OF  
**Springs and Axles**

For Coaches, Phaetons, Buggies, Wagons, &c

PITTSBURGH, PA.

**UNION FOUNDRY AND PULLMAN CAR WHEEL WORKS,**

GEORGE M. PULLMAN, President.

CORRESPONDENCE SOLICITED AND ESTIMATES MADE ON

**HEAVY MACHINERY, AND ALL SIZES OF FLY WHEELS, PULLEYS, &c.**

Special Machinery for Grain Elevators, Grain Steam Shovels, &c., contracted for. Car Wheel and Car Castings at lowest rates.

Office, First National Bank Building, CHICAGO.

**RIEHLÉ BROS.**  
STANDARD  
**SCALES**  
AND  
TESTING  
MACHINES



Cleveland Iron Ore Paint Co.

MANUFACTURERS OF

PURE IRON ORE PAINTS,

Red (Rosie), Purple and Brown. We guarantee all our paints, and respectfully solicit the patronage of consumers and dealers. Our paints are used largely by the railroads and car builders of our country. Send for Price List No. 15.

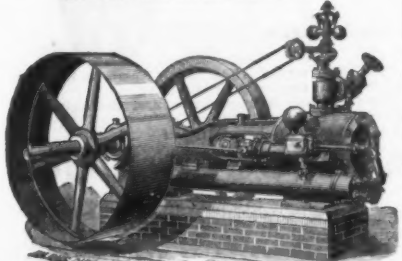
OFFICE: 154 MERWIN ST., CLEVELAND, O.

**BEST  
IRON  
PAINT.**



OUR  
NEW ILLUSTRATED  
CATALOGUE AND PRICE LIST  
OF  
**SCALES**  
AND  
**BUTCHER TOOLS**  
Is now ready and will be sent to the trade on  
application to  
**JOHN CHATILLON & SONS,**  
85, 87 and 89 Cliff St.,  
NEW YORK.

IF YOU WANT A STRONG, ECONOMICAL  
**ENGINE,**  
Either **HORIZONTAL** or **VERTICAL**,  
For steady every-day and all-night service and  
at a **LOW PRICE**, write to  
**COOKE & CO.,**  
22 Cortlandt Street, NEW YORK.



Twelve hundred Engines in use.  
Please mention this paper.

**REFRIGERATORS**  
AND CREAMERIES.  
GET  
THE  
BEST.

**THE LEONARD**  
CLEANABLE, with Mov-  
able Flues, Solid Ash,  
Carved and Ornament-  
ed, TRIPLE WALLED,  
CHARCOAL FILLED and  
METAL LINED, making  
Five Walls in all. Solid  
Iron Shelves and Air-  
Tight Locks. Outlets  
all others at sight on its  
merits alone. Secure  
the agency and capture  
the sales. Don't fail to  
write for Catalogue.



**GRAND RAPIDS REFRIGERATOR CO.,**  
GRAND RAPIDS, MICH.  
New York Warehouse, No. 105 Chambers St. Francis T.  
Witte Hdw. Co. Sole Agents. Samples and Stock  
for Eastern trade constantly on hand.

**J. M. STUTZMAN,**  
181 William St., New York,  
Manufacturer of  
**Steel Alphabets**  
DIE LETTERS FOR SEAL  
ENGRAVERS,  
**BRANDS, SEALS,**  
**POST-OFFICE STAMPS,**  
**Door Plates,**  
Steel Stencil-Cutting Dies,  
Soap Moulds and Brass  
Stamps.  
SEND FOR PRICE LIST.

**A NOVELTY IN SHOVELS.**  
MAYNARD'S  
PATENT SOLID CAST STEEL SOCKET  
**SHOVELS AND SPADES.**

Forged from a single piece of Cast Steel, with-  
out welding. The best, strongest and hand-  
somest ever made. For sale by

**GEO. W. BRUCE,**  
1 Platt Street, New York.

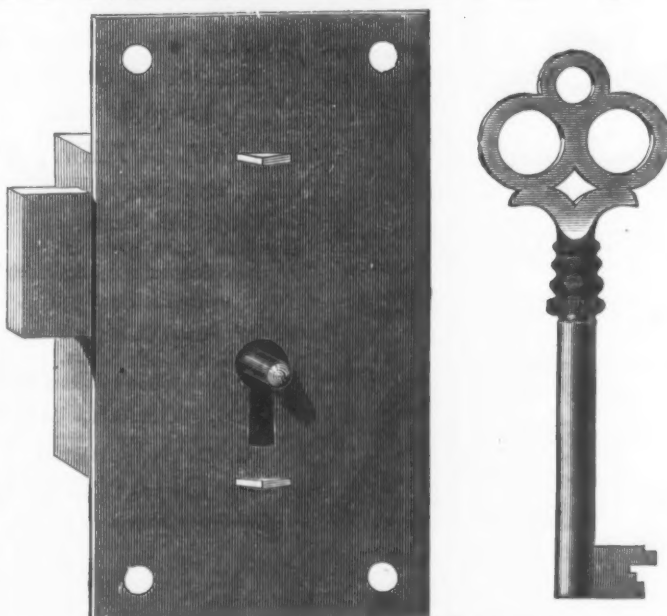
**THE**  
**Humphries Mfg. Co.,**  
MANSFIELD, OHIO.

Manufacturers of  
Iron, Brass and Brass-Cyl-  
inder Claters, Pitcher,  
Well and Force  
**PUMPS,**  
Windmill, Boiler Feed  
Horizontal and Rotary  
**Pumps.**  
Hydraulic Rams, Iron  
and Brass  
**CYLINDERS**  
of every description,  
and other  
**HYDRAULIC MACHINERY.**



## EAGLE LOCK CO.,

Manufactories at Terryville, Conn., and Geneva, Ohio.



Salesroom at No. 98 Chambers St., New York, U. S. A.

MANUFACTURERS OF THE LARGEST VARIETY OF

## Cabinet, Trunk and Pad Locks

MADE BY ANY ONE CONCERN IN THE WORLD.

Illustrated Catalogue Mailed to the Trade Free upon Application.  
Orders for special Die and Press Work and Small Brass Castings solicited at our Terryville Works.

## HARTMAN

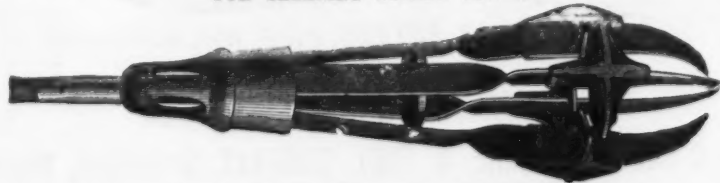
## "STANDARD" NAILS

The Hardwareman who does not know what a  
"Standard" Nail is, and therefore is not selling  
them, can hear of something to his advantage by  
addressing

**HARTMAN STEEL CO., LIM'D,**

BEAVER FALLS, PA.

**THE NATIONAL STEEL TUBE CLEANER,**  
FOR CLEANING BOILER TUBES.



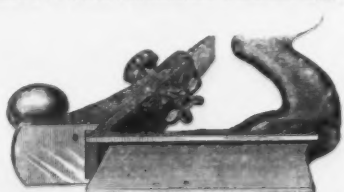
ENDORSED BY THE BEST ENGINEERS.

**THE CHALMERS-SPENCE CO.,**  
419 East 8th Street, New York.

**STANLEY RULE AND LEVEL COMPANY,**  
A MANUFACTURER OF  
IMPROVED  
**CARPENTERS' TOOLS.**

FACTORIES:  
**NEW BRITAIN,**  
**CONN.**

WAREHOUSES:  
**29 Chambers Street,**  
**NEW YORK.**



The front section of this Plane, to which the Cutter is attached, is  
movable up and down. It can be firmly secured to the rear section  
of the Plane at any desired point by means of a Thumb-Screw. Without  
the use of any other tool, this Plane will do perfect chamfer or stop-  
chamfer work of all ordinary widths. No. 72, Iron Stock, 9 inches in  
length, 1 1/2 inch Cutter, \$2.00.

**TINGUE, HOUSE & CO.,**

MANUFACTURERS OF,

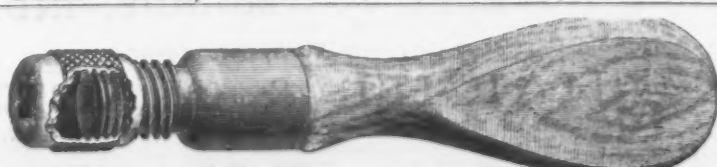
**FELTS AND FELTING**

IN WHEELS, SHEETS OR BY THE YARD,

For Manufacturers and Machinery Purposes.

MILLS,  
**GLENVILLE, CONN.**

SALESROOM AND OFFICE,  
**56 Reade St., NEW YORK.**



**BALE PATENT TOOL HOLDER.**

Will hold any tool designed for the bit-stock. Manufactured by

**SYRACUSE TWIST DRILL CO.,**

**SYRACUSE, N. Y.**

Agents: H. H. & C. L. Munger, Chicago, Ill.; R. C. Graves, 72 Reade St., N. Y.; Riley & Chapman, Baltimore, Md.

ring protecting the gun is of wrought iron, 16 inches thick, with a flat roof 6 inches thick. The special feature claimed by the constructors is the mode of firing, which is electric and automatic. There are no sights either on the guns or on the turret, and the firing is carried on by contact points which can be moved along a graduated arc inside. The turret makes a whole turn after each salvo, the loading being effected in the meantime, so that, as soon as the position at which the contacts have been adjusted is reached, the guns are automatically fired. The German cupola is of a new form. It resembles a rather flat umbrella, and the whole of the supporting structure is contained in a single chamber and occupies little light. The leading principle constitutes something of a new point of departure. The umbrella-shaped armor plates are supported on a central pivot and steadied in position by four legs carrying trucks provided with spiral springs. The guns have no recoil proper, and on firing, therefore, the shock extends itself in imparting vibratory motion to the whole structure, which shakes much as a mushroom may be supposed to do in a gale. The armor plates have a thickness of 8 inches, and, for the purpose of the experiment, were partly compound and partly wrought iron. Not only does it offer a target which at moderate ranges could be rendered nearly invisible, but, wherever struck, it presents a very oblique surface, capable of deflecting shells coming at any reasonable angle.

The guns in the French turret were of the De Bauge type; those in the German turret were Krupp's, both being practically the same caliber, 6 inches. Precisely similar guns were used for the attack, and neither can be considered as in any sense equaling in power the more recent siege guns, while they clearly fall far short of the ordnance which the next 10 years of artillery progress will produce. This was the more unfortunate, since, on the one hand, it may reasonably be contended that greater results might be obtained in attack by siege guns already existing, and, on the other hand, the non-recoil principle of the German turret lies open to the objection that it is conceivably inapplicable to more powerful guns.

The attack was commenced at 1000 meters range, and both turrets received an amount of pounding probably representing a siege of several years' duration. The French turret had the advantage of being turned backward and forward during part of the time, which insured a greater dispersion of the blows, while in the case of the German turret the greater part of the projectiles struck on a single plate. At the end both were so nearly breached that a single shell striking either at the weakest point would have entered with ease. Many small bolts and rivet heads were detached in the German turret, while the French turret received no interior damage; both were able to turn as easily as before, and their guns were repeatedly fired without any difficulty. In the firing at the embrasures the wrought-iron plates of the German turret behaved admirably, deflecting all the projectiles, and proving that a hit in the immediate neighborhood of the port entailed no danger to the guns.

Throughout the experiments, in fact, the curved wrought-iron plates took their punishment well, and, while the steel faces of the compound plates showed a tendency to strip off and to crack under repeated blows, the softer material succeeded in turning the excellent Krupp steel shells so that the damage was inconceivable. The principal fact brought out by the experiments is the great advantage of the curved wrought-iron plates, but whether the peculiar principle adopted by Messrs. Gruson is applicable to heavier guns remains uncertain. The decision which has now to be taken will affect the question of cost of the defense of Bucharest to an important extent, and this consideration may lead to a reopening of the question of the necessity for so large a provision of turrets.

### Hardware in Germany.

The leading iron, steel and hardware district of Germany, says an English contemporary, is Westphalia and Rhenish Prussia, a large area in which these industries are chiefly centered in a space shown on the map between Aachen (Aix-la-Chapelle), Cologne, Düsseldorf, Oberhausen, Dortmund, Hamm, Iserlohn and Siegen. Near and in the free city of Hamburg there are also several branches of the hardware trades carried on with much success. At Hanover, Magdeburg, Stettin, Breslau, Brunswick, Halle, Leipzig, Chemnitz, Carlsruhe, Frankfurt, Nuremberg, Augsburg, Ulm, Darmstadt, Mayence, Munich, Stuttgart, Esslingen, Kaiserslautern, Pforzheim, Mulhausen, Tübingen, Reutlingen, Berlin and many other places, the engineering, iron, stove and other industries flourish and employ large numbers of workmen. So far as Sheffield is concerned, her competitors are mainly located in Westphalia, Rhenish Prussia and certain parts of Wurtemberg. In the last named there are various manufactures of electroplate and silver goods, as well as of table and pocket cutlery, surgical instruments, scythes, sickles, tools and files. The makers of Wurtemberg turn out fairly large quantities of these goods, but there is no reason for supposing that many of them reach England, although there are sales to Australian and other buyers in our colonies, as well as to Switzerland, Italy, Greece, Spain and other countries.

The bulk and forefront of German steel, hardware, cutlery and tool competition, however, emanate from Westphalia and Rhenish Prussia, the principal towns and places where these trades are carried on being Barmen, Elberfeld, Remscheid, Solingen, Ruhrort, Laar, Essen, Oberhausen, Bochum, Aachen, Düren, Dortmund, Haspe, Hamm, Annen, Hagen, Schalke, Hohenlimberg, Eschweiler, Iserlohn, Duisburg, Langendreer, Warstein, Osnabrück, Wetter, Lüdenscheid, Horde, Düsseldorf, Schwerte, Altena, Kabel, Werdohl, Dahlbruch, Plettenberg and various other towns and villages.

The best known of these places are Barmen, Elberfeld, Remscheid and Solingen. Barmen and Elberfeld are virtually one town, with a joint population of nearly 200,000, as they are connected by a long

road which is built up more or less for its entire length. The buildings are mostly low (although some are handsome), and the streets are irregular, while the country round about, including the environs of Solingen and Remscheid (the two places being separated by a deep valley), is not unlike that about Sheffield within a moderate area, and not including the Derbyshire moors and highlands. The district is essentially dingy, and often dirty—indeed, it presents many features in common with our own hardware localities. As in the older days of Hallamshire, streams of water are largely utilized for actuating water-wheels, and also hundreds of "little masters" and still larger numbers of out-workers.

As a matter of fact, these parts of Germany have for centuries been devoted to the production or working up of metals. Count Adolph, of Berg, a crusader, is said to have settled Damascene sword-cutters at Solingen in 1147, while in the year 1200 scythe-makers from Styria settled at Remscheid. In the fifteenth century Ratingen was celebrated for its helmets and armor. In the sixteenth and seventeenth centuries there were considerable exports of arms made from Remscheid and Solingen. At the beginning of the eighteenth century, the wearing of arms then beginning to go out of fashion, trade fell off at Solingen, but before long the gradual introduction of the modern system of standing armies created a large business in cutting and stabbing weapons, of which Solingen had its share. Scissors-making grew into an important industry during the eighteenth century, and the present one has seen the adoption of a number of small trades—umbrella fittings, portemonnaie frames, revolvers, &c. In 1792 Solingen employed 18,000 hands in the metal trades, including some 4000 engaged in the manufacture of arms. Remscheid, Cronenberg and Lüttringhausen originally formed the center of the manufacture of scythes, sickles and bar iron. A secession of the guild of makers of these articles in 1867 led to their manufacture being transplanted into the Mark district. The defection of this trade was succeeded by a development of tool-making—files, saws, chisels, planes, &c. The manufacture of blue scythes, which at one time was a secret confined to Syria, was begun in 1778 in the Müngsten. Remscheid was and is the center of the manufacture of tools and implements, which stretches from Velbert, in the north, over Cronenberg, Lüttringhausen, Radevormwald, Halver to Wermelskirchen, in the south, and borders the Solingen area of manufacture. The value of the goods manufactured in the commune of Remscheid in 1866 was £909,500. Nearly half of these goods went abroad. Both Remscheid and Solingen are indebted in part for their prosperity to the numberless mountain rills, which are utilized in the turning of grindstones and raising of hammers.

Until recently certain manufactures were carried out exclusively by small masters, working themselves with or without help. Now things are done on a larger scale. In 1876 there was still in Remscheid 1125 little masters, with 1252 men and 597 apprentices; there were also 255 manufacturers, with 2547 hands. In strict connection with the manufacturing industry of the old Duchy of Berg is that of Mark, carried out in the communes of Hagen, Altena and Iserlohn. In 1661 Solingen cutlers started their manufactures at Elipa, near Hagen. The Berg smiths, who seceded in 1687 from Cronenberg and Lüttringhausen, settled on the Godelsberg, the Eusepienstrasse and in Hagen. The goods they made were all heavy, but of very various kinds. Fine tools and implements came to be made principally in Berg, and coarse ones in Mark. In the valleys of the Volme and Lenne wire-making has been carried on for ages, the fine bar iron known as "Osemundeseisen" serving as the raw material. Iserlohn was celebrated in the Middle Ages for its armor; it is now best known for its electroplate and metal goods. The privileges of the wire-drawers of Altena were confirmed in 1456. In Hagen coarse, in Altena medium, and in Iserlohn fine, wire was made. With the present century trade began to assume larger proportions. The old tilt hammers were replaced by rolls, and the manufacture now comprises all kinds of hardware and ironmongery.

As regards the steel trade, it is well known that cementation steel was introduced into England in the seventeenth century by a German workman from the county of Mark, but, although it must have been known in Germany long before, that country and France remained far behind England in excellence of manufacture. Vismara, of Cremona, in 1824, converted bar iron into steel by its introduction into the retorts of an oil-gas apparatus, and Mackintosh, in 1825, attained the same result by means of coal gas. The manufacture of steel by a process analogous to puddling was undertaken at Limburg on the Lemme in Westphalia (1834), as well as at Weyerhammer, in Bavaria; in 1836, at Frantschach, in Carinthia; in 1839, at Wetter-on-the-Ruhe; in 1845, at Geitebrücke, near Hagen, in Westphalia, and in 1849 at Eberwald, in Steiermark, but without any beneficial results. Puddled steel was successfully produced in 1850, at Haspe, in Westphalia, by the engraver, Bremme, and his coadjutor, the chemist Lohage (both of Unna). The invention was rapidly diffused throughout Germany, 13 steel-puddling furnaces having been set in action in Westphalia in 1851. In the Prussian dominions the chief part of the steel produced up to 1855 was manufactured in Westphalia, around Remscheid, Lohngen and Hagen. A portion was also made in Silesia, Thuringia and the Brandenburg district. In 1872 the manufacture of steel of all kinds in the Prussian provinces was 287,904 tons, distributed over 53 steel works, which employed 21,531 workmen. The return of manufactured steel of all kinds in 1872 was 273,602 tons. The total quantity of all kinds of iron and steel manufactured in Germany during the same period was 41,735,981 cwt., a quantity which has been enormously increased of late years.

Statistics issued under official authority some time ago gave the following figures as to the production, number of works, workmen, &c., in the metal trades of the whole of the German Empire: Steel works 66,





**J. R. TORREY & CO.,**  
Manufacturers of Razor Strops & Dressing Cases,  
Sole Agents for Worcester Cutlery Co.  
Importers of Fine Razor Blades.

**American Made Razors,**  
WARRANTED BEST CUTTERS IN THE WORLD.  
**J. R. TORREY RAZOR CO.**  
Factories: WORCESTER, MASS.  
Send for Price Lists.

New York Office: 97 CHAMBERS STREET.

**UNDERHILL, CLINCH & CO.,**

94 Chambers Street, New York,

DEPOT FOR

**A. Field & Son's Tacks, Brads, Nails, &c.**

Nicholson File Co.'s Files.  
Russell Jennings' Auger Bits.  
Geo. Selsor & Co.'s Hatchets, Hammers, &c.  
American Screw Co.'s Wood and Machine Screws,  
Store and Tire Bolts, Rivets, &c.

Brade's Brick Trowels.  
O. Ames & Son's Shovels, Spades and Scoops.  
E. W. Gilmore & Co.'s Strap and T Hinges.  
W. & S. Butcher's Edge Tools.

GENERAL HARDWARE.

## FISHING TACKLE.

IMPORTERS, MANUFACTURERS AND DEALERS IN

Fish Hooks, Rods, Reels, Silk and Linen Fish  
Lines, Artificial Flies, &c., &c.

MANUFACTURERS' AGENTS FOR

**SKINNER'S CELEBRATED SPOON BAITS,**

Patent Adjustable Float and Sinker, "Wheeler's" Split Bamboo Fishing  
Rods, "Nason's" Patent Portable Net Rings and Staffs,  
"Allen's" "Hand Laid" Fishing Lines, "Globe"  
Braided Silk, Linen and Cotton Lines.  
"Mann's" Trolling Spoon Baits.

**Dame, Stoddard & Kendall,**

Successors to BRADFORD & ANTHONY,

374 Washington St., BOSTON, MASS.

**RICHARD DUDGEON,**

No. 24 Columbia Street, New York.

Maker and Patentee of the Improved

**Hydraulic Jacks**  
AND  
**Punches.**

Roller Tube Expanders and Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.  
Jacks for pressing on Car Wheels or Crank Pins made to order.

**CLEVELAND**  
**ALVANIZIN**  
WORKS,  
**H. H. HODELL & CO.**  
Galvanizing in all its branches. Specialty of WIRE MESH  
and Fine Work.  
CLEVELAND, OHIO.

**THE NORFOLK SHEAR CO.,**

Manufacturers of the finest line of Steel-laid Shears, Scissors, Bent Trimmers,  
Bankers' Shears, Button-hole Scissors and Dental Snips. Also the best Steel-laid  
Straight Trimmers for the money in the market. "New England." We pay particular  
attention to hardening and tempering our  
goods, and they can be relied on for possessing  
superior cutting qualities. A fair trial of our  
goods will convince of their merit.

**SAHURU A. HAINES,** General Agent, No. 86 Chambers Street, NEW YORK.  
Send for Illustrated Catalogue, with discount. Factory, NORFOLK, CONN.

**HOWE BROTHERS & HULBERT,**  
West Winsted, Conn.,

Manufacturers of  
**SHEARS**  
AND  
**SOLID FORGED STEEL**  
Scissors, Corkscrews and Hardware Specialties.  
**Clayton Brothers,**

**BRISTOL, CONN.,**  
Manufacturers of **Cast Shears,**  
Screw Drivers, Kitchen Knives, Roller Skates, &c.  
The Best and Cheapest in the Market. Send for Prices.

**NATIONAL FRONT CO.**  
MANUFACTURERS OF  
**DUNCOMBE'S**  
PATENT FRONTS & ROSETTS  
AND KILN TILES  
Correspondence Solicited

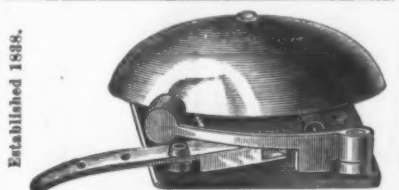


**THE F. WILSON**  
**Pat. Grinding Mill**  
FOR  
GRINDING WET, GREEN, GREASY OR DRY BONES.  
Send for Descriptive Catalogue and Price List.

Sole Manufacturers,  
**WILSON BROS.,** EASTON, PA., U. S. A.  
**The \$5 Hand Mill.**  
**HAWLEY BROS. HARDWARE CO.,**  
301 to 303 Market St.,  
SAN FRANCISCO, CAL.  
Agents for the Pacific Coast.

**CORPORATE MARK,**  
\* \*  
**JOSEPH RODGERS & SONS'**  
(LIMITED)  
**CELEBRATED CUTLERY,**  
No. 82 Chambers Street, New York.  
**F. & W. CLATWORTHY, AGENTS.**

The demand for JOSEPH RODGERS & SONS' pro-  
ductions having considerably increased, they have, in  
order to meet it, greatly extended their Manufacturing  
Premises and Steam-power.  
To distinguish articles of JOSEPH RODGERS &  
SONS' manufacture, please to see that they bear their  
Corporate Mark.



**BEVIN BROS., MFG. CO.,** Easthampton, Conn.,  
Manufacturers of  
Sleigh Bells, House, Tea, Hand, Gong Bells, &c.

**MONTGOMERY & CO.,**

IMPORTERS

**Stubs' Files, Tools and Steel,**

Grobet Swiss Files, Chesterman's Tapes, Rules, &c., Hubert's French Emery Paper,  
Horseshoe Magnets, &c., Wm. Smith & Sons Celebrated Music Wire, Nos. 2 to 30,  
French Sheet Steel, 3/4 in. wide, from 4 to 65 Thousandths.

Machinists', Silversmiths', Jewelers' Die Sinks and Sewing Machine Manufacturers' Supplies.

PATENTED IMPROVED  
DOUBLE SPEED INDICATOR,  
Either Right or Left.



GEO. W. MONTGOMERY,  
GEO. W. CHURCH,

105 Fulton St., New York.



**PATENT COMBINATION WRENCH.**

Case-Hardened Throughout. Parts Interchangeable.

This Wrench not only combines the superior qualities of a Gas Pipe Wrench but also  
all the requisite combinations of a regular Nut Wrench, thus making a combination  
which has no equal.

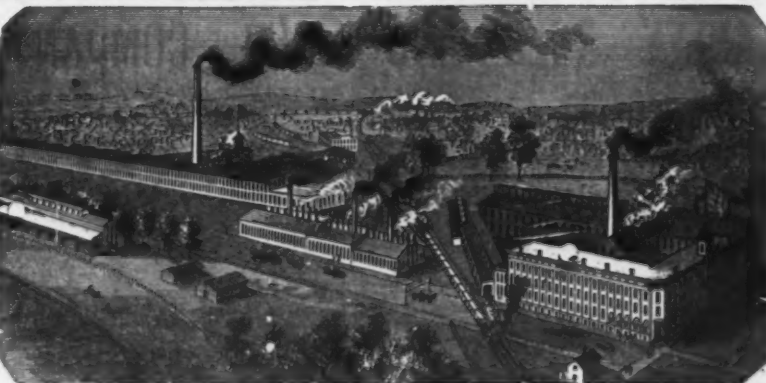


**No. 3 PATENT PIPE WRENCH.**

The serrated jaws of the Wrench are interchangeable; that is, the same serrated plate  
may be used for either the stationary or sliding jaw, so that if one plate is broken another  
can be furnished adapted to either jaw with out express designation. The slides, nuts and  
various parts are also interchangeable, thus easily repairing the Wrench at very small  
expense, and with as perfect practicability for further use as when the Wrench was new.  
For Circulars and Price List, address

**BEMIS & CALL HARDWARE & TOOL COMPANY, Springfield, Mass.**

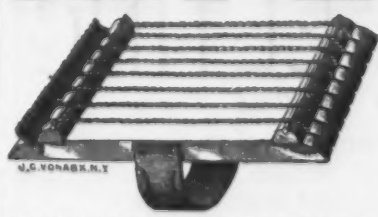
**CARRIAGE HARDWARE.**



**THE E. D. CLAPP MFG. CO., Auburn, N. Y.**

**JAY-EYE-SEE**

New Improved Patent Wire  
**CURRY COMB.**



Lightest and best for general use. Most durable  
Comb made. Most humane and only Comb fit to use on  
a horse's legs, shoulders and flanks. It lifts every hair  
and throws out the dirt. Rubs and cleans the skin, but  
cannot cut or scratch it. Is without a rival for cleaning  
a muddy or sweaty animal. A wonder on a shedding  
horse. It cleans itself, and has an improved attachment  
which cleans a brush with ease and rapidly. Send for  
Circulars and Prices. Sample by mail, 50 cents.

MANUFACTURED BY

**MUNCIE NOVELTY CO., MUNCIE, IND.**

Maltby, Curtiss & Co., New York, Sole Agents.

**SMALL GRAY HAIGHT & CLARK,**

**Iron Founders, Albany, N. Y.,**

MANUFACTURERS OF  
ORNAMENTAL AND ART CASTINGS, ROSETTES AND PICKETS FOR WIRE WORKERS,  
Bases and Boots for Wire Forms, Piano and Organ Castings, Machinery Cast-  
ings, Stove Patterns taken from the Wood. Correspondence invited for all  
kinds of Castings. Japanning, Nickel-Plating, Bronzing, in all their Branches.  
Send for Wire Workers' Catalogue.

Established 1836.

**Alfred Field & Co.,**

93 Chambers and 75 Reade Streets,

NEW YORK,

IMPORTERS OF

**HARDWARE, CUTLERY, GUNS.**

SOLE AGENTS FOR

Joseph Elliot & Son's Razors.  
Eley Bros.' Caps, Wads, &c.  
Isaac Greaves' Sheep & Garden Shears.

HEADQUARTERS FOR

Wostenholm's Pocket Cutlery & Razors.

W. & S. Butcher's Razors.

John Wilson's Butcher Knives, &c.

**ANVILS. CHAIN. FILES.**

**GEO. H. CREED,**

**SHIP CHANDLERY,**

103 Reade Street, New York,

Manufacturer of and wholesale dealer in Cotton  
and "Long Flax" Sail Duck, Cotton and  
Linen Havens, Creed's Patent Ships' Crews, Hel-  
man's Wire Rope Splicers. Agent for Raymond's  
American Crane Oil, for lubricating cylinders and  
valves.



Established in 1839.

**A. G. COES & CO.**

WORCESTER,

MASS.,

Successors to

**L. & A. G. Coes,**

Manufacturers of

**THE GENUINE**

**COES**

**Screw**

**Wrenches.**

PATENTED,

May 9, 1871.

December, 26, 1871.

December, 25, 1875.

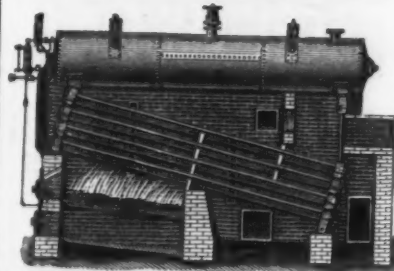
August 1, 1876.

The back strain when the wrench is used is  
borne by the bar—not by the handle.  
The strongest Wrench made, and the only suc-  
cessful Re-enforced Bar.  
None genuine unless stamped

**A. G. COES & CO.**

Our Agents, JOHN H. GRAHAM CO., 113 Cham-  
bers St., New York, carry a full line of our goods,  
and will be pleased to serve you at factory prices.

**Water Tube Safety Boilers**



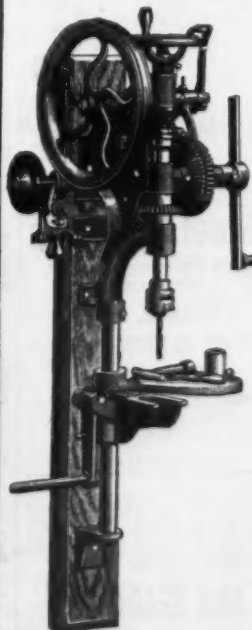
(MOORE'S SYSTEM.)

Unequaled for durability, safety and economy.  
Examinations made with ease. Cleaned quickly  
and easily. Circulation rapid and sure.

**National Water Tube Boiler Co.**

N. Y. ENGINEERING CO., 64 CORTLANDT ST.,

Circulars and Testimonials. AGENTS.



**GEO. BURNHAM & CO.,** Worcester, Mass.,  
Manufacturers of  
**BLACKSMITHS' UPRIGHT SELF-FEEDING DRILLS,**  
Patented March 29, 1883, July 23, 1883 and June 16, 1885.  
Superior design. Unrivalled workmanship. Last improvement.  
Send for Illustrated Price List.

**SHELF BOXES**  
SEND FOR CATALOGUE TO  
**JESSE JONES & CO.**  
615 Commerce St. Phila.

**PATENT OFFICE,**

**Roeder & Briesen,**

82 and 84 Nassau St.,  
NEW YORK.

American and Foreign

**PATENTS**  
Solicited promptly and at the lowest rates.



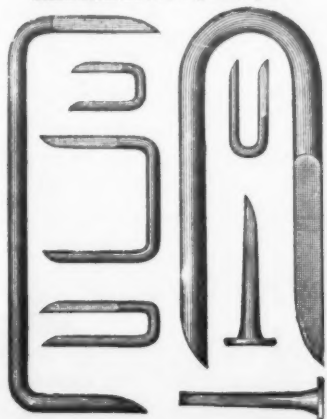
# HALL & ELTON'S GERMAN SILVER



In addition to Spoons of this well-known brand, we are now prepared to furnish Forks of the same quality. We GUARANTEE these goods to be SOLID and of UNIFORM quality throughout, with no coatings to wear through or flake off, and with no liability to RUST.

HALL, ELTON & CO., Wallingford, Conn., and 47 E. 13th Street, New York.

**FLORENCE TACK CO.,**  
P. O. BOX 39, FLORENCE, MASS.,  
Manufacturers of every variety of



TACKS, SMALL NAILS, DOUBLE-POINTED TACKS and STAPLES.  
Our STEEL CLINCH STAPLES will drive in harder wood or mortar than when made from iron. They can also be clinched as well as any soft iron staples.

AGENTS IN ALL FOREIGN COUNTRIES.



119 South Fourth Street, PHILADELPHIA.  
Branch Office, 605 Seventh St., Washington, D. C.  
H. HOWSON, Engineer and Solicitor of Patents.  
O. HOWSON, Attorney at Law and Counsel in Patent Cases.  
SEND FOR CIRCULARS.

**THE MENEELY HARDWARE CO.,**  
WEST TROY, N. Y.,

Manufacture Safety and Guard Harness Snaps  
Snap-Links for chain adjusting and repairing.  
Rope Goods for horses and cattle, Breast Chains  
with sleeve snaps, &c., &c.  
Price List and Descriptive Catalogue sent free.

**W. H. McMILLAN,**

113 South St. (Up-Stairs), bet. Peck Slip and Beekman St., New York.

**Block and Pump Manufacturer.**

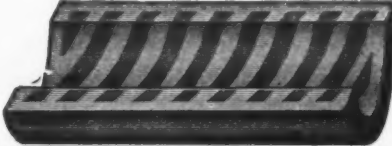
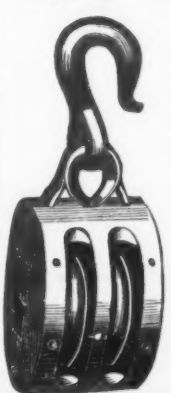
Manufacturer of Inside Iron Strap and all kinds Tackle  
Blocks, Mast Hoops, Hanks, Belaying Pins, Hand Spikes,  
Hand Pumps, &c. Also Dealer in Lignumvitae Wood,  
for Beam Faces and Roller Beds, &c.

Telephone Calls: Office, "Nassau 142." Factory, "Williamsburg 377."

Factory: 32 to 40 Penn St., Brooklyn, E. D.

Sole Agent for John Smalley's Graphite Bushings.

NO OIL REQUIRED.



Agent for Wilson Mfg. Co.'s Pat. Sheaves and Roller Bushings.

**SHUBERT & COTTINGHAM,**  
MANUFACTURERS OF ALL KINDS

**TACKLE BLOCKS.**

Lignum-Vitae and Iron Sheaves.

Plain, Roller and Self-Lubricating Bushings.

Heavy Purchase Blocks

FOR  
Contractors, Builders, Railroad and Mining Use.

118 North Delaware Avenue,

Factory, Beach and Norris Streets.

PHILADELPHIA, - - PA.

SEND FOR CATALOGUE.

**BAGNALL & LOUD BLOCK CO.,**

BOSTON, MASS.,

MANUFACTURERS OF THE

**CELEBRATED STAR BRAND OF TACKLE BLOCKS.**



These goods can be obtained of the general hardware trade and of our

AGENTS

F. BALDWIN, 33 South St., New York.

J. F. LOVEJOY, 103 Chambers St., New York.

C. H. GURNEY & CO., 247 Lake St., Chicago.

BRODERICK & BASCOM ROPE CO., St. Louis.

BAUGARDNER, WOODWARD & CO., Philadelphia, Pa.

UHLER & ENGLISH, Philadelphia, Pa.

**"YALE"**

IMPROVED

**Hallway Letter Boxes.**

THESE boxes are intended for use in Hallways of Office Buildings, Apartment Houses, &c., and are coming into very general use in cities where the carrier system has been adopted.

The box is very strong, being made of iron, cast in one piece. Security is guaranteed also by the use of a Yale Lock with Corrugated Key. The flap at top can be raised and through the opening thus exposed letters may be dropped into the box. The grating at the bottom enables any one to see at a glance, without opening his box, whether it contains any mail or not. The attachment of the box to the wall is very simple, secure and easy.

**ADVANTAGES:**

Safety and promptness in delivery of the mail.

Prevention of delivery of mail to unauthorized parties.

An established place where any letters received may always be found.

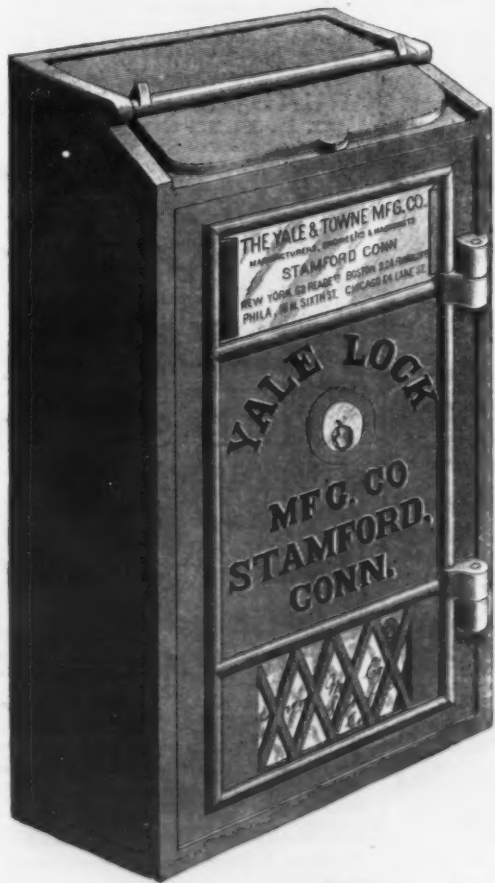
Price Lists on Application.

SOLE MAKERS:

**THE Yale & Towne Mfg. Co.,**  
STAMFORD, CONN.

New York, 62 Reade St.  
Chicago, 64 Lake St.

Philadelphia, 15 N. Sixth St.  
Boston, 224 Franklin St.



Full Size of Key.

with 23,831 workpeople. The total number of workpeople employed in the iron and steel trades, 172,711, and aggregate production of iron goods, 2,784,108 tons. In the latter total there figured, in tons: Rail fastenings, 29,538; railway axles, 17,824; railway wheels, 30,808; tires, 43,083; wire, 292,038; tools, 1903; steel ingots and billets, 65,135. Of the manufactured steel and iron 25 per cent., of railway wheels and axles about 35 per cent., of wire 54 per cent. and of ironmongery 70 to 75 per cent. were exported.

The same statistics show that at the end of 1875 there were in Germany 156,443 workshops engaged in the manufacture of iron and steel goods, giving employment to 360,003 workpeople. Of workshops employing more than five assistants there were:

	Workshops.	Assistants.
Sheet-iron goods.....	451	8,738
Brads, nails, screws, &c.....	270	2,105
Locks, iron safes, &c.....	1,400	17,417
Cutlery, scythes, pens, &c.....	761	15,960
Needles.....	43	3,927
Wire goods.....	182	3,140
Firearms.....	359	9,163
Copper goods.....	190	2,923
Lead and tin goods.....	101	1,808
Zinc goods.....	36	720
Shot and leaden bullets.....	5	33
Metallic alloys.....	591	15,336
Lamps, &c.....	90	3,359
Gold and silver wire-drawers and imitations.....	140	2,189
Gold and silver goods and jewelry.....	47	1,804
Sewing machines.....	649	15,064
Mathematical, &c., apparatus.....	46	3,900
Optical.....	306	4,471
Surgical instruments.....	35	463
Telegraphic apparatus.....	31	1,023
Clocks, &c.....	146	3,427
Musical instruments.....	4,332	18,404

During the 11 years which have elapsed since these returns were prepared there is little doubt that the numbers of firms and workpeople have greatly increased, a fact which shows not only the extent of these industries in Germany, but also the necessity that exists for the manufacturers to find export outlets for their products.

## Amended Rules and Regulations for Steamboat Boilers.

The Board of Supervising Inspectors of Steam Vessels having recommended certain amendments to steamboat rules and regulations, the Secretary of the Treasury has ordered that the boilers for using petroleum shall be constructed in all their parts of wrought iron or steel.

The Secretary of the Treasury has also approved of the following rules for testing boiler iron:

### RULE I.

Sec. 6. To ascertain the ductility and other lawful qualities, iron of 45,000 pounds tensile strength and under shall show a contraction of area of 15 per cent., and each additional 1000 pounds tensile strength shall show 1 per cent. additional contraction of area up to and including 55,000 T. S. Iron of 55,000 T. S. and upward, showing 25 per cent. reduction of area, shall be deemed to have the lawful ductility. (Sections 4430, 4431, Revised Statutes.) All steel plate of 1/2-inch thickness and under shall show a contraction of area of not less than 50 per cent. Steel plate over 1/2 inch in thickness shall show a reduction of not less than 45 per cent. Provided, however, That steel plate required for repairs to boilers built previous to April 1, 1886, may be used for such repairs when showing a contraction of area of not less than 40 per cent.

### RULE II.

Sec. 6. No braces or stays, hereafter employed in the construction of boilers, shall be allowed a greater strain than 6000 pounds per square inch of section (and no stay-screw bolt shall be allowed to be used in the construction of marine boilers where used in salt waters, but such screw-stay bolts may be used in staying the fire-boxes and furnaces of such boilers, and not elsewhere, when used in fresh waters, when in the opinion of the local inspectors it can be done with safety), and no screw-stay bolt shall be allowed to be used in the construction of marine boilers in which salt water is used to generate steam. But such screw-stay bolts may be used in staying the fire-boxes and furnaces of such boilers, and not elsewhere, when fresh water is used for generating steam in said boilers.

Sec. 9. (Last two paragraphs.) [Lap-welded flues less than 7 inches in diameter, and not less than 3 inches in diameter, shall have a thickness of material of not less than 0.14 inch. All tubes less than 3 inches in diameter shall have a thickness of material of not less than 0.12 inch. But in no case shall this rule be construed as allowing any greater pressure on any boiler than that regulated by law on the cylindrical shell of the boiler according to its tensile strength.] 7 inches in diameter and less shall be in accordance with the following table of thicknesses:

Diameter.	Thick.	Diameter.	Thick.
7 inches.	0.165 inch.	2 1/4 inches.	0.109 inch.
6 inches.	0.154 inch.	2 inches.	0.096 inch.
5 inches.	0.130 inch.	1 3/4 inches.	0.083 inch.
4 inches.	0.109 inch.	1 1/2 inches.	0.072 inch.
3 inches.	0.096 inch.	1 1/4 inches.	0.061 inch.
2 inches.	0.083 inch.	1 1/2 inches.	0.050 inch.
1 3/4 inches.	0.072 inch.	1 1/4 inches.	0.040 inch.
1 1/2 inches.	0.061 inch.	1 1/2 inches.	0.030 inch.
1 1/4 inches.	0.050 inch.	1 1/4 inches.	0.020 inch.
1 1/2 inches.	0.040 inch.	1 1/2 inches.	0.010 inch.
1 1/4 inches.	0.030 inch.	1 1/4 inches.	0.005 inch.

### CORRUGATED FURNACE FLUES.

Sec. 10. (New paragraph at end.) The strength of corrugated flues, when used for furnaces on steam chimneys (corrugation not less than 1 1/2 inches deep), and provided that the plain parts at the ends do not exceed 6 inches in length, and the plates are not less than 1/4 inch thick when new corrugated and practically true circles, to be calculated from the following formula:

$$\frac{12,500}{D} \times T = \text{pressure.}$$

T = thickness in inches.  
D = mean diameter in inches.  
Example: Given, a corrugated flue 40 inches mean diameter, 1/4 inch thick. Required, the pressure allowed by inspectors.

$$P = \frac{12,500}{D} \times T = \frac{12,500 \times 0.25}{40} =$$

$$\frac{6250.0}{40} = 156.25 \text{ pressure.}$$

Sec. 14. Vertical tubes or boilers shall not be used on steamers navigating the Red

River of the North and rivers whose waters flow up the Gulf of Mexico unless the water line is 2 inches above the upper end of the tubes and fire line. (Sec. 4405, R. S.) Vertical tubular boilers (built after September 1, 1885) shall not be used on steamers (upon any navigable waters of the United States) unless the water line is at least 2 inches above the upper end of the tubes and fire line.

Sec. 17. All boilers hereafter placed in steamers shall have a clear space of at least 8 inches between the under side of the cylindrical shell and the floor or keelson. [All manholes for the shells of boilers shall have an opening not less in diameter than 11 x 15 inches in the clear, except that boilers less than 34 inches diameter of shell have an opening in the clear in manholes of not less than 9 x 14 1/2 inches; all boiler shells between 34 and 38 inches diameter an opening not less than of 9 x 16 inches, and all boiler shells between 38 and 48 inches in diameter an opening not less than 11 x 15 1/2 inches.]

Sec. 22. All steamers shall have inserted in their boilers plugs of Banca tin, at least 1/2 inch in diameter at the smallest end of the internal opening, in the following manner, to-wit: Cylinder boilers with flues shall have one plug inserted in one flue of each boiler; and also one plug inserted in the shell of each boiler from the inside, immediately before the fire line, and not less than 4 feet from the forward end of the boilers. All fire-box boilers shall have one plug inserted in the crown of the back connection, or in the highest fire service of the boiler. All upright tubular boilers used for marine purposes shall have a fusible plug inserted in one of the tubes at a point at least 2 inches below the lower gauge-cock (and at least 12 diameters of the tube above the lower crown-sheet), and said plug may be placed in the upper head-sheet when deemed advisable by the local inspectors. All fusible plugs, unless otherwise provided, shall have an external diameter not less than that of a 1-inch gas or steam pipe screw-tap, except when such plugs shall be used in the tubes of upright boilers plugs may be used with an external diameter of not less than that of a 3/4-inch gas or steam pipe screw-tap, said plugs to conform in construction with plugs now authorized to be used by this board; and it shall be the duty of the inspectors to see that these plugs are filled with Banca tin at each annual inspection. (Section 4418, Revised Statutes.)

Sec. 24. (Paragraph 17.) [And safety-valves on donkey and auxiliary boilers on steam vessels shall be required to have the same area in proportion to grate surface as that required for safety-valves on the main boilers.] Donkey boilers used on all steam vessels for driving pumps, hoisting engines, electric lights or other purposes must be inspected the same as the main steam boilers, and supplied with water and steam gauges, and the safety-valves must comply with the same regulations as the main boiler.

Sec. 34. (New.) All holes cut through the bottom or bilge of a steam vessel that are covered by a sea-valve or cocks, and secured to the skin of the vessel by bolts and connected to the engine and boilers by pipes, shall be arranged so as to be accessible at all times, so that if a leak or defect occurs it can be reached. Said valves, seats, stems and bolts shall be of brass when used in salt water. A stop-cock or valve shall be placed between check-valve and boiler on all feed-pipes, in order to facilitate access to connection. When a hole is cut in a boiler (hereafter built) it shall be strengthened around the opening with iron of equal strength to that removed. Providing said holes are 6 inches and larger on boilers carrying a pressure of 100 pounds and upward.

## The Foreign Trade of Chili

The Department of Commercial Statistics of the Republic of Chili has lately published a large volume of 800 pages, got up with extreme care, which is entitled "Commercial Statistics of the Republic of Chili for the year 1884." The general trade of the country in 1884, when compared with that of 1883, shows a falling off to the extent of \$14,264,791, whereof \$1,634,385 fall to the share of importation, and \$12,630,406 to that of exportation. In the "special trade" there is also a reduction which amounts to \$14,504,542. On the other hand, the transit trade shows an advance of \$702,278; the home coasting trade has increased \$4,416,742; the increase of the shipping business may be said to be by 645 ships of 790,450 tons burden in addition to those in 1883, and the custom-house receipts are \$924,192 in currency ahead of those of the previous year.

Among the various descriptions of goods landed in the 14 ports of the Republic, we shall mention, in the first place, engines, machinery, tools and other articles intended for industries, arts and trades. The value of goods under this head has receded from \$5,536,302 in 1883 to \$5,494,729 in 1884, being a falling off of 1.63 per cent.; whereas the value of the articles added—locomotion, railways and telegraphs—shows an increase of 183.61 per cent., since it rose from \$960,422 in 1883 to \$2,723,935 in 1884. Despite the great strides the iron trade has made of late years both in Germany and the United States, the aggregate value of raw and manufactured iron imported from the United Kingdom is far in the lead. In some branches—for instance, in those classified as non-galvanized sheet iron, hoop iron and galvanized sheet iron—the German competition is felt a little more, although even in these a great many lengths still separate the rival races. The figures tell their own tale plainly enough. Iron galvanized sheets imported from England, 2810 tons, against 413 tons from Germany; hoops, 929 tons, against 107 tons, and galvanized sheet iron, 1859 tons, against 220 tons imported from Germany. The importation of manufactured iron of other than British make is insignificant. As regards exportation, there can be no doubt that it has fallen off very much indeed. In 1883 it amounted to \$70,710,777; in 1884 it did not exceed \$57,766,450, so that the decrease was no less than 19.6 per cent. The value of Chili bars exported was \$11,231,006, against \$12,688,760 in 1883;



# H. D. SMITH & CO.,

Plantville, Conn.,

MANUFACTURERS OF THE

## BEST QUALITY CARRIAGE MAKERS' HARDWARE,

Manufacture the Largest Variety of Forged Carriage Irons, of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.



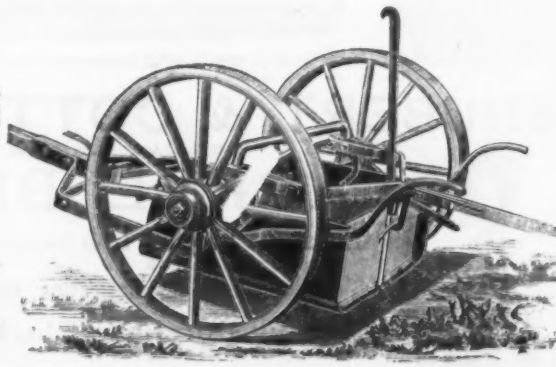
### HASLUP'S PATENT WHEEL SCRAPER

Has great advantages over all others. It has more capacity, is easier handled by man and team, and the only Wheel Scraper made that does not make the horses' necks sore. It has all the latest improvements and excels any thing of the kind ever offered to the trade. Good on long and short hauls. Three sizes, 9, 13 and 16 cubic feet.

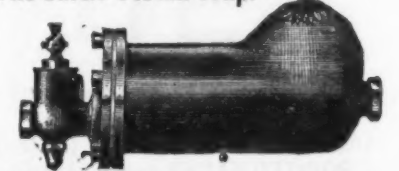
### HASLUP'S ALL STEEL DRAG SCRAPER

Beats all others for capacity, durability, strength and light draft. Being ALL STEEL (except wood handles), are lighter, stronger and better made than any other. Three sizes. Also Township and Railroad Flows.

SIDNEY STEEL SCRAPER CO.,  
SIDNEY, OHIO, U. S. A.



### The Curtis Steam Trap.



Has automatic air discharge; has a differential opening, thus discharging all the water as fast as it comes. Is very accessible for cleaning, the valve being on the outside. Send for circular. Manufactured by the  
**CURTIS REGULATOR CO.,**  
61 Beverly St., BOSTON, MASS.  
GENERAL AGENCIES: 109 Liberty St., N. Y.; 10 N. 7th St., Phila., Pa.; 56 and 58 Market St., Chicago Ill.; 49 Halliday St., Baltimore, Md.; 24 6th St., Pittsburgh, Pa.; 745 Craig St., Montreal; 707 Market St., St. Louis.

WARNER'S  
**Wood Worker's Clamps**  
FOR  
Carriage, Cabinet and  
Machinists' Use.  
MANUFACTURED BY  
**The G. F. Warner Mfg. Co.,**  
Malleable and Grey Iron Founders,  
212 to 228 EAST STREET  
NEW HAVEN, CONN.  
Send for prices.

**S. A. HAINES & CO.,**  
Iron, Steel, Nails and Hardware,  
90 Chambers Street, New York.

**Richmond Star Lawn Mower.**  
Lightest, Easiest Running and  
Best Made.

For prices please write to:

DILLE & M. GUIRE MFG. CO., Richmond, Ind.  
S. A. HAINES & CO., New York.  
H. O. STRATTON, Boston, Mass.  
SHIELDS & BRO., Philadelphia, Pa.  
WALSH, HOEN & VON KAPFF, Baltimore, Md.  
HAWLEY BROS. HARDWARE CO., San Francisco, Cal.  
W. T. BARBEE, Lafayette, Ind., and Chicago, Ill.  
WELLS & NELLAGAR CO., Chicago, Ill.  
WHITMAN & BARNES MFG. CO., Cincinnati and Chicago.  
HOWELL, GAND & CO., Cincinnati, Ohio.  
WITTE HARDWARE CO., St. Louis, Mo.  
SHAPLEIGH & CANTWELL HARDWARE CO., St. Louis, Mo.  
ST. LOUIS HARDWARE CO., St. Louis, Mo.  
D. AUSTIN & CO., Kansas City, Mo.  
D. H. SMITH HARDWARE CO., Sedalia, Mo.  
KILBOURN, JONES & CO., Columbus, Ohio.  
DAVIS & HUNT, Cleveland, Ohio.

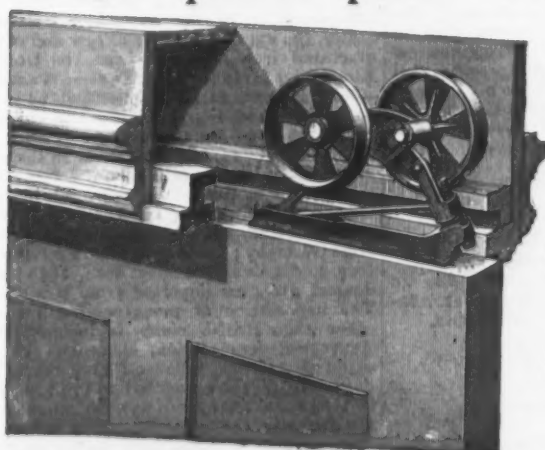


T. B. RAYL & CO., Detroit, Mich.  
GUNN HARDWARE CO., Grand Rapids, Mich.  
HILDEBRAND & FUGATE, Indianapolis, Ind.  
JAMES WOODWELL & CO., Pittsburgh, Pa.  
MILLER BROS. & FLETCHER, Minneapolis, Minn.  
MORRISON & CO., Atlanta, Ga.  
C. M. MCCLUNG & CO., Knoxville, Tenn.

### A. FIELD & SONS, MANUFACTURERS OF **WIRE NAILS**

of Every Quality and Description.  
Taunton, Mass., & 78 Chambers  
Street, New York,

### Barry's Patent Parlor Door Hanger.



The only Hanger made that  
will not bind on an  
uneven track.

Send for Circular and Prices  
to

**SYRACUSE BOLT CO.,**  
Syracuse, N. Y.,

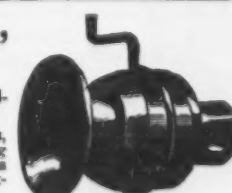
OR  
**HENRY B. NEWHALL CO.,**  
105 CHAMBERS STREET,  
New York Agents.

**"STEAM"** A valuable book for every  
Steam user and Engineer,  
published for FREE DISTRIBUTION by  
**THE BABCOCK & WILCOX CO.,**  
Manufacturers of  
**WATER-TUBE BOILERS,**  
107 Hope St., GLASGOW. 30 Cortlandt St., NEW YORK.



### W. R. OSTRANDER & CO.,

81 & 83 ANN STREET, NEW YORK,  
Manufacturers of  
SPEAKING TUBES, WHISTLES, ELBOWS, ORAL ANNUN-  
CIATORS, BELL & ELECTRIC WIRE TUBING.  
Complete outfits of Speaking Tubes, Whistles,  
Pneumatic Bells, &c. A full line of Speaking  
Tube Hardware constantly on hand. Catalogues  
on application. Factory, DeKalb Ave., near Knicker-  
bocker, Brooklyn, L. I.



**RHODE ISLAND HORSE SHOE CO.,**  
MANUFACTURERS OF  
**Horse, Mule & Snow Shoes OF THE Perkins Pattern.**

Works at Valley Falls, R. I. Office, 31 Exchange Place, Providence, R. I.  
F. W. CARPENTER, President. C. H. PERKINS, Gen'l Manager. R. W. COMSTOCK, Secretary.

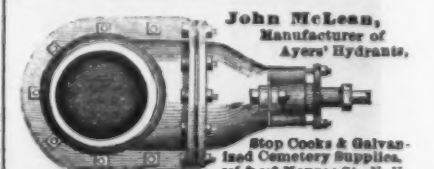


**METAL AND RUBBER STAMPS,**  
steel figures and letters,  
name stamps, type for type  
writers, chased-iron figures  
and letters, stamps for ruling  
letters on wood or  
metal, branding irons, pat-  
tern letters, stencils, house numbers, metal-bodied  
rubber type, rubber stamps, &c. Send for free illus-  
trated catalogue.  
BELLWIS & DICKEY 837-843 Sheriff St., Cleveland, O.

### COBB & DREW, PLYMOUTH, MASS.,

Manufacturers of Copper, Brass and Iron Rivets;  
Common and Swedes Iron Leathered, Carpet, Lace  
and Gimp Tacks; Finishing, Hungarian, Trunk,  
Clout and Cigar Box Nails, &c. Rivets made to  
order.

NEW YORK AGENCY,  
**GRUNDY & DISOSWAY,  
HARDWARE,**  
165 GREENWICH STREET.  
Agents for the Philadelphia Star Carriage and Tire Bolts.



### SOLID SPOUT MINERS' LAMP.



**THE HATCH BROTHERS CO.,**  
BRIDGEPORT, CONN.,

Patented Novelties,  
FINE POCKET CUTLERY, SPECIAL TOOLS OR  
MACHINERY, LIGHT HARDWARE, &c.  
Blades for Special Purposes Made to Order.



ESTABLISHED 1855

# A. WICKOFF & SON

PATENT

WOOD WATER PIPE  
CHAIN-PUMP-TUBING

101 to 111 EAST-CHUNG-PLACE  
EUMIRA-NEY

## N. Y. MALLET & HANDLE WORKS,

Manufacturers of  
CALKERS', CARPENTERS', STONE CUTTERS', TIN,  
COPPER AND BRASS MAKERS'

### MALLETS,

Hawking Bees, Hawking  
and Calking Irons; also all  
kinds of Handles, Sledge,  
Chisel and Hammer Handles.

ALSO  
Cotton & Bale Hooks.  
Patented Feb. 13, 1877, a new  
combination of Hooks.  
456 E. Houston St., N. Y. City

## E. PHILLIPS & SONS,

MANUFACTURERS,  
South Hanover, Mass.

# TACKS.

F. R. EMMONS & BRO.  
158 CHAMBERS STREET,  
New York.

P. W. Gallaudet  
& Co.,  
Cor. Broadway and Wall St., New York.  
Stocks and Bonds dealt in for cash or on margin at  
New York Stock Exchange.

## WHIPPLE MFG. CO.

MANUFACTURERS  
Door Locks, Knobs,  
BRONZE GOODS AND BUILDERS' HARDWARE.  
Soft Small Gray Iron Castings a Specialty.  
CLEVELAND, OHIO, U. S. A

## The Bolton Steel Co.

CANTON, OHIO,  
MANUFACTURERS OF BEST REFINED

# Tool Steel

And Other Fine Grades of  
**CAST STEEL**

The Scientific Portable Forge.

Hand Blowers,  
Entirely new in principle.  
No Ratchets, Pawls or Friction  
Devices.  
18 styles and sizes for all kinds of  
work. Fully guaranteed.  
Manufactured by  
The FOOS MFG. CO.  
SPRINGFIELD, OHIO.

Fairbanks & Co., AGTS.  
311 Broadway, N. Y.  
115 Main St., Buffalo, N. Y.; 171 Coxsack St., Phila., Pa.  
11 Light St., Baltimore, Md.; 45 Wood St., Pittsburgh, Pa.  
32 Broadway, Albany, N. Y.; 43 Camp St., New Orleans, La.

## PATENTS.

PROMPT WORK.  
MODERATE FEES.  
U. S. and Foreign Patents  
procured. Trade Marks  
secured. Fully guaranteed.  
4 years experience in U. S. Patent Office. Patent  
causes litigated. Expert searches and opinions  
as to scope, validity and infringement of patents. Send  
model or sketch of your invention for free opinion  
whether patent can be secured, and new book on pat-  
ents, citing recent court decisions. Mention this pa-  
per. E. B. STOCKING, 415 7th, opp. Patent Office,  
Washington, D. C.

## KEYSTONE SCREW CO.,

17th and VENANGO STS., PHILA.  
J. BILLERBECK,  
Manufacturer of  
IRON AND BRASS  
Gimlet-Pointed Wood Screws.  
WHITE FOR DISCOUNTS.

## NEW YORK BELTING & PACKING CO.

WAREHOUSE: 15 PARK ROW, NEW YORK.  
THE OLDEST AND LARGEST MANUFACTURERS IN THE UNITED STATES OF

### VULCANIZED RUBBER IN EVERY FORM ADAPTED TO MECHANICAL PURPOSES

MACHINE BELTING  
WITH SMOOTH METALLIC RUBBER SURFACE.  
THIS COMPANY HAS MANUFACTURED THE LARGEST  
BELTS MADE IN THE WORLD FOR THE PRINCIPAL  
ELEVATORS AT CHICAGO, BUFFALO AND  
NEW YORK.

STEAM AND WATER HOSE.  
RUBBER TEST HOSE.  
ANTISEPTIC FOR THE USE OF STEAM AND HAND FIRE  
ENGINES, FORCE PUMPS, MILLS, FACTORIES, STEAM-  
ERS AND BREWERS.

CAR SPRINGS OF A SUPERIOR  
QUALITY  
Original Solid Vulcanite Emery Wheels.

PATENT ELASTIC RUBBER BACK SQUARE PACKING.  
BEST IN THE WORLD.  
FOR PACKING THE PISTON RODS AND VALVE STEMS OF STEAM ENGINES AND PUMPS.

CORRUGATED  
RUBBER MATS AND MATTING.  
FOR HALLS, FLOORING, STONE & IRON STAIRWAYS, ETC.

JOHN H. CHEEVER, TREASURER.

## The Cameron STEAM PUMP

IS THE  
Standard of Excellence  
AT HOME and ABROAD.  
THE  
A. S. CAMERON  
Steam Pump Works,  
Foot of East 23d St., New York.

## H. A. ROGERS, 19 John St., N. Y.

### RAILWAY AND MACHINISTS' SUPPLIES.

EVERY REQUISITE IN THE LINE.  
TANITE EMERY WHEELS.  
SOLE U. S. AGENT FOR MONCRIEF'S SCOTCH GAUGE GLASSES.

BUCK BROTHERS, MILLBURY, MASS.  
The Most Complete Assortment in the U. S. of  
Shank, Socket Firmer and Socket Framing Chisels.

## PLANE IRONS.

CAUTION.—Buyers should be on their guard and not have inferior goods palmed on them by unprincipled  
persons who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have  
on our trade-mark also, "Riverlin Works."

## VARIETY IRON WORKS. ALFRED C. REX & CO.,

MAIN OFFICE AND FACTORY,  
FRANKFORD, PHILADELPHIA.  
BRANCH OFFICES,  
PHILADELPHIA, 413 Commerce St.,  
NEW YORK, 104 Chambers St.,  
CHICAGO, 89 Lake St.,  
SAN FRANCISCO, 109 California St.

Hardware Specialties  
AND  
Novelties in Iron, Brass  
and Bronze.  
Special attention paid to Electro-  
plating in all its branches.

## BORTHWICK'S PATENT ROTARY SAW SET.

—BORTHWICK'S—  
PATENT ROTARY SAW SET.

EXAMINE THE PRINCIPLE as illustrated in cut. NOTICE ROTARY ACTION by which a perfect set is  
assured without danger of breaking teeth. For Price List and Terms address  
BORTHWICK SAW SET CO., 337 Market St., Philadelphia, Pa.

## THE HUNTINGTON EMERY WHEEL DRESSER, Improved.

—THE—  
NEW YORK  
SUPPLY CO., LIMITED,  
50 AND 52 JOHN STREET.

PAT. OCT. 11 1875  
EXCLUSIVE  
Agents for New York,  
50 AND 52 JOHN STREET.

silver in nuggets and bars, \$2,989,355,  
against \$2,951,564 in 1883; and rounds of  
copper, \$1,223,033, against \$748,763 in 1883.  
We ought to mention also that the value of  
the guano exported in 1884 did not exceed  
\$1,132,874, while in the previous year it  
amounted to as much as \$5,292,910. Most  
of the Chili bars still find their way to Great  
Britain, the value of these for 1884 being  
\$7,879,437, against \$2,901,354, which is the  
value of those exported to France.

### SCIENTIFIC AND TECHNICAL.

#### Fast Tunneling Work.

The rate of progress on the new Croton  
Aqueduct tunnel has been very remarkable.  
On the 10 shafts on which the greatest  
progress was made the average monthly  
progress was 32.9 feet per month, the high-  
est being 70 feet, and the next 41 feet.  
This is less notable, but on the headings the  
results attained are almost unprecedented.  
Working on both headings of 25 shafts for  
periods of from two to eight months the  
total progress has been 22,541 feet, or 4.27  
miles. On the 10 headings where the best  
progress was made the average progress has  
been 119.6 feet per month, the best average  
being 171.7 feet. On the same heading the  
greatest single month's progress thus far in  
any one heading on the line was made,  
257.5 feet of tunnel, 16 x 16 feet, having  
been driven in the month from July 25 to  
August 25 with Ingersoll Eclipse drills,  
through granitic gneiss. According to the  
Railroad Gazette this is said to be the fast-  
est tunnel-driving on record with any ma-  
chine drill, except at the Suto Tunnel in  
Nevada, where 287 feet advance were made  
in December, 1878, and in the east end of  
Vosburg Tunnel, where 268 feet of heading  
(8 x 29 feet) were driven in one month. As  
an average of the entire work up to the  
close of October, 1885, there would appear  
to have been the equivalent of 230 months'  
work of one heading done on the 50 head-  
ings worked, allowing that the first month's  
record only covers an average of 15 days.  
This gives 98 feet per month average pro-  
gress on the whole 50 headings worked,  
which is a very extraordinary average for  
so large a work. The shafts are about 1 1/4  
miles apart, and the total length of the aque-  
duct is 33 1/4 miles, all but 3000 feet of which  
are tunnel. As the progress up to last Octo-  
ber had averaged close on to 1 mile per  
month of active work, it is evident that the  
completion of even this enormous tunnel—  
the greatest work of the kind in the world—  
will not be long delayed.

#### A Deep-Sea Lighthouse.

A few years ago it was proposed by Mr. C.  
Anderson, of Leeds, to construct deep-sea  
lighthouses in the form of a large cylinder of  
wrought iron, 200 feet long and 36 feet in  
diameter, having a tower rising 140 feet  
above the water, and fitted up as a lighthouse.  
The middle part was to be made unsinkable  
by a packing of buoyant material, and the  
lowest part was to be ballasted. A new  
plan, invented by the late Captain Moody,  
has been illustrated by a large model con-  
structed at the Barrow Shipbuilding Co.'s  
yard. It consists of a central vessel of iron  
or steel, divided into water-tight compart-  
ments, and having four rays projecting  
from it. An iron bulwark runs round the  
vessel, and scupper-holes are specially pro-  
vided to carry off storm water. The vessel  
is anchored by four cables running from be-  
tween the rays, and in deep water the  
cables would be moored to buoys anchored in  
the sea. In shallow water the cables run  
direct to the mooring anchors. A telegraph  
cable connecting the vessel with the shore  
runs through a hole in the center of the hull,  
so as not to be fouled with the anchoring  
cables. A lattice tower of steel starts from  
the hull, and is to be fitted with a lantern 60  
feet above the water line. The length and  
breadth of the central hull in actual practice  
would be 80 feet. Every accommodation  
for the lighthouse keepers and telegraphists  
would be provided, together with a sufficiency  
of stores. The hull is of an arched or curved  
form to resist the waves better, and, owing  
to its form and mooring, it can also keep its  
position in any state of wind and tide. The  
model which was recently tried successfully  
at Barrow is to be submitted to the Trinity  
Board, and sent later on to the Shipping  
Exhibition at Liverpool. The question of  
ocean telegraph and lighthouse stations is no  
doubt a very important one, and it is likely  
enough to be realized in the future. Already  
we have a step in that direction in the case  
of the lightship off Walton, Essex, which is  
in communication with the shore by a cable  
some 8 or 9 miles long, laid by the  
Telegraph Construction and Maintenance  
Co., and worked by telephone and telegraph.  
Quite recently it did prompt service in call-  
ing out, and subsequently stopping, the dis-  
trict lifeboat before it put to sea, owing to  
the fact that the vessel which was in distress  
had succeeded in getting off the "ground"  
before the lifeboat was launched.

#### Aluminum Iron and Steel.

It is reported that Mr. Nordenfelt, the in-  
ventor of the well-known machine gun, has  
discovered that solid castings of wrought  
iron or mild steel may be obtained, without  
changing the intrinsic quality of the metal,  
by the addition of the metal aluminum,  
either alone or in the shape of an alloy. The  
aluminum makes the molten metal more  
liquid; thus the gases in the metal pass easily  
away, the metal runs easily into the molds,  
and a more perfect product is obtained.  
Even a minute quantity of metallic aluminum  
added to the molten iron has an appreciable  
influence. Perfect castings of considerable  
ductility and great tensile strength have  
been made from the softest wrought iron.  
The iron or steel is melted in crucibles, con-  
verters or metal melting furnaces of any de-  
scription, and the addition of the aluminum  
or alloy of aluminum is made to the metal,  
when molten, shortly before it is to be poured.  
The addition may, however, be made earlier.  
It is convenient to provide a plug in the  
cover of the crucible, which is removed  
when the metal is completely melted, a tube  
is inserted into the aperture, and the alumi-  
num to be added is passed down the tube.  
The tube is removed, the plug replaced, and  
the metal is soon ready for pouring.

### Foreign Markets.

#### FRANCE.

PARIS, March 18, 1886.—Metals.—There being  
nothing of a disturbing nature hampering trade  
at present, Metals have moved off steadily at  
tolerably well-sustained prices. Copper has risen  
way slightly, and so has Lead, but Spelter is bet-  
ter. We quote at the close, in francs, 100 kg.:  
Copper, Chili Bars, 104.50 @ 108; Ingots and Slabs,  
111.25; Best Selected, 112.75; and Pure Coroco-  
Ore, 108.50. Tin.—Banca, 232.50; Billiton, 240.50;  
Straits, 248.75; Australian, 249.25, and English,  
248.50. Lead, 32.75 @ 33.50, and Spelter, 40.50 @  
41.50. Iron.—Nothing has as yet been resolved  
upon by the Chambers in the way of public works,  
and in this city the iron situation seems to be get-  
ting worse than ever. The Paris works have com-  
menced selling Flooring Iron as low as 11.50 francs;  
dealers will find it difficult to compete with them  
unless they can buy in the Northern Department for  
less than 10 francs, and we do not think rolling mills  
there are prepared to accept 9.75. Old Rails may  
be quoted 6.50 francs. There is no change at the  
North; they quote Merchant No. 1 @ 11.50 francs;  
Beams, 10.50 @ 11.50; Fuddled Sheet Iron, 13.50,  
and Boiler do., 16. In the Ardennes activity is  
limited to executing late Railroad-Material orders;  
new orders are scarce and small. In the Haute-  
Marne the few commands dropping in are for  
immediate delivery and at low prices. In the  
Longwy district of the Meurthe-et-Moselle lower  
freight rates by rail have been the means of pro-  
ducing a slight stir.—*Moniteur des Interests  
Materiels.*

#### BELGIUM.

BRUSSELS, March 18, 1886.—Iron.—Our market  
has come to a complete standstill during the  
week without causing a further decline, except in  
Charleroi Puddling Pig, which gave way 1 franc  
1/2 ton, selling at 3.80 francs 1/2 100 kg., and Luxem-  
bourg accepting 3.50, while obtaining 4 in Ger-  
many. As for Merchant No. 1 in this market the  
same does not bring over 9.50 for export, while  
Beams cannot be sold any better than 9.25. Sheets  
may be had at 12.90 francs for export. The ac-  
cident which occurred at the Liverpool Exhibition  
Building cannot be imputed to the Belgian build-  
ers of it, as the official investigation has proved,  
showing that the masonry of the foundation was  
defective. During these times of dullness in iron  
industry the latter is making some laudable head-  
way in this country. The Aisne rolling mills have  
introduced a new system of building, and several  
orders have been executed for foreign account;  
the columns, while sufficiently strong, are lighter.  
This method is specially adapted for the building  
of hospitals in warm countries. Business in the  
iron line has become a greater disappointment  
from week to week as we advance, so that it is  
difficult to foretell what sort of a spring trade there  
is to be. Cheap goods and easy money do not  
seem to have any more the attraction they had in  
former years; consumers hesitate as much as  
ever, although spring is now at hand. Coal.—  
While Coal for domestic use has remained active  
and firm, Steam Coal is comparatively neglected  
and weak.—*Moniteur Industriel.*

#### GERMANY.

HAMBURG, March 18, 1886.—Iron.—The demand  
for Spiegeleisen in Rhenish-Westphalia is not quite so  
brisk as it was in February; still fair amounts are  
being shipped abroad. All other sorts of Pig Iron  
remain depressed; even Luxembourg puddling the  
syndicate is selling lower. We quote 10 1/4 to 12 1/2  
Spiegeleisen, 47 @ 50 marks; German Bessemer, 42 @  
44. Rolling-mill products stand very much in need  
of a lift; a convention is now to put Rod Iron in  
better shape, following therein the example of  
Sheet-Iron makers. In Upper Silesia the same  
number of furnaces are in blast, but the produc-  
tion is now less than 8000 tons weekly. While this  
is the case, 15,000 tons of Pig Iron are being exported  
monthly. Still the tendency is the reverse of  
firm, foreign markets being overstocked. Pud-  
dling Pig may be quoted 43 @ 44 marks 1/2 ton.  
Foundries are meanwhile doing better and all  
Castings are firmly sustained. Rolling mills have  
a fair share of work, the demand coming from all  
branches. This animation is not only domestic,  
but quite as much for export. The advance in  
Merchant Iron of 2 1/2 @ 5 marks 1/2 ton is firmly ad-  
hered to. Steel Rails are worth 135 @ 135 1/2 marks  
1/2 ton at the lowest. Metals.—There is an increasing  
demand for Lead, the price of which is tending  
upward. We quote at the close: Copper, 47 @ 58  
marks; Lead, 14.50 @ 16; Tin, 105 @ 108; Spelter,  
15.40 @ 15.60; Sheet Zinc, 20 @ 20.70; do. Gray, 20  
@ 22, and do. White, 21 @ 22.—*Borsenhalles.*

#### HOLLAND.

ROTTERDAM, March 14, 1886.—Tin.—The market  
has on the whole been quiet at 56.50 guilders 1/2  
50 kg., Banca, spot; Billiton, April delivery, 56.25;  
July, 56.25, and from the coming March sale,  
Banca, 56.25 @ 56.50.—*Koch & Vlierboom.*

#### SPAIN.

BILBOA, March 14, 1886.—Iron.—The demand for  
Iron Ore has been light; shippers do not seem  
anxious to operate, and heavy rains have besides  
impeded transportation. Ore shipments so far  
amount to 622,792 tons, against 618,782 in 1885, 563,  
136 in 1884, 570,358 in 1883, 491,523 in 1882 and 440,679  
in 1881.—*Revista Minera.*

#### AUSTRIA.

VIENNA, March 14, 1886.—Iron.—The long and  
severe winter has to some extent done harm to the  
spring trade and the resumption of building, both  
public and private. Hence the demand for Struc-  
tural Iron is slack, and those makers who did not  
yet join the combination are becoming more and  
more indifferent about the matter. Meanwhile  
the iron market is decidedly weak at the ensuing  
quotations: White Pig, 43 @ 44; Gray, 46 @ 48;  
Bessemer, 52 @ 54; Styrian Merchant, 117.50 @  
122.50; Bohemian, 95 @ 97; Sheets for locksmiths,  
145 @ 160; do. for roofing, 160 @ 170; do. for boil-  
ers, 150 @ 175, and for tanks, 140 @ 150; Beams,  
100 @ 105. Metals are steady: Copper, 57 @ 66;  
Tin, 122 @ 124.50; Spelter, 18.25 @ 19, and Lead,  
14.50 @ 17 florins.—*Austrian Trade Journal.*

#### CHILI.

VALPARAISO, January 22, 1886.—Copper.—Our  
market has been irregular in consequence of lower  
cable advices, and fluctuations in exchange rates  
for the fortnight amount to 23,897 quintals at  
\$15.30 @ \$15.60, free on board; \$15.40 equals 239.  
4/5, with 30 freight. Nitrate.—There has been no  
demand except for the United States and Bill-  
ing up a few vessels for Europe previously char-  
tered; for Europe hardly anything has transpired,  
holders not feeling disposed to abate from their  
demands. Sales run up some 250,000 quintals at  
\$2.15 @ \$2.25 for 95 %; \$2.20 equals 9.24, with 25/  
freight and 2 1/2 exchange. Charterers amount  
to 210 quintals for Europe, and 4093 for the  
United States. Shipments during three calendar  
years:

	1883.	1884.	1885.
To the North of Europe.....	11,449,227	10,390,810	8,554,987
To the Mediter- ranean.....	200,305	195,576	41,930
To the United States on the At- lantic.....	987,367	1,211,714	827,296
To the United States on the Pa- cific.....	157,390	49,073	77,712
Total.....	12,794,289	12,539,173	9,501,625

Coal.—Owing to excessive supply, coal has not  
improved. We quote West Hartley, 30 @ 20;  
Orrell, 18/4, and Australian, 18/4. Exchange, 90  
days sight, on London, 25/4d.—*Weber & Co.*

#### EAST INDIES.

PERANG, February 9, 1886.—Tin.—The Chinese  
New Year's festivities have restricted both receipts  
and sales. After declining to \$31.35, the market  
recovered to and closes firm at \$31.85. Receipts  
700 piculs, of which Europeans took 2900 and  
Chinese 2500. Shipments to January 27 = 13,575  
piculs, against 14,069 last year, and 14,446 in 1884.  
Exchange, four months' bank on London, 3/4 @  
3/4 1/4.—*Schmidt, Kustermann & Co.*

SINGAPORE, February 15, 1886.—Tin.—The sales  
have been 125 tons only at up to \$32.50, which is  
the nominal value at the close, but buyers make  
no offers. Stocks are small, and receipts will be  
limited for some time to come. Tonnage.—Rates  
continue steady, but cargo is not very plentiful.  
In addition to the vessels already reported the  
Christine has been fixed for New York. For Bos-  
ton the berth is vacant. Exchange is weak at 8 1/2  
for six months' sight credits. January shipments  
from the Straits settlements to the United States  
have been 5045 piculs, against 1390 last year; 6476  
in 1884, 13,360 in 1883, 15,516 in 1882 and 2190 in 1881.  
—*Guthrie, Wood & Co.*



## BUFFALO PORTABLE FORGES AND HAND BLOWERS.



Warranted Superior to any other make, and  
Guaranteed to give Perfect  
Satisfaction.

For sale by all the leading  
Iron, Hardware and Machinery  
Dealers throughout the country

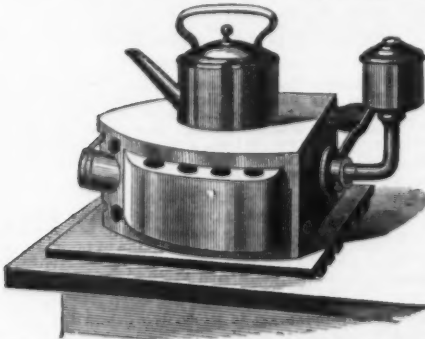
**BUFFALO FORGE COMPANY,**  
BUFFALO, N. Y.

Send for Complete Catalogue.

PENFIELD BLOCK CO.,  
Lockport, N. Y.,  
would like to hear from you.

**FOX SAD-IRON CO.,**  
78 MAIDEN LANE,  
NEW YORK.

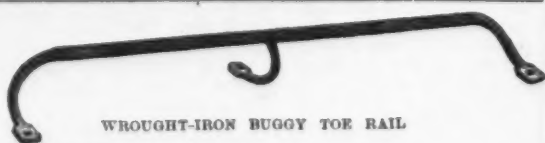
Awarded the only Gold Medal at the New Orleans Exposition over all  
Sad-Iron competitors.



Our Iron does away with Hot  
Kitchens.

Being reversible, one Iron does the work  
of an entire set (one side heats while the  
other is in use). It combines first-class  
Fluter and Polisher, also makes the best  
little Cooking Stove for a sick-room, &c.,  
ever invented. Can be used with either  
Gas or Alcohol. Very simple and abso-  
lutely safe in handling.

Write us for  
Prices.



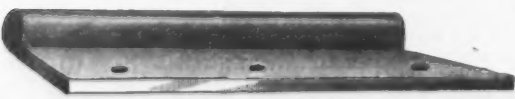
WROUGHT-IRON BUGGY TOE RAIL

**The Cleveland Hardware Co., Cleveland, Ohio,**

MANUFACTURERS OF

WROUGHT-IRON **HARDWARE** CARRIAGE and SLEIGH  
WAGON,

Rollers of Special Shape Iron.



WROUGHT BUGGY RUB IRON.

**THE HOPSON & CHAPIN MFG. CO.,**  
PEQUOT FOUNDRY & MACHINE WORKS,  
New London, Conn.

Fine Iron Foundry and Machine Work.

Acquaintance With New Work is Solicited.  
The plant of our works embraces complete equipment for Iron Foundry, Machine Shop, Polishing, Bronz-  
ing, Japanning, Coppering, Lacquering, Brass Electro-Plating on Iron, and Pattern Designing and Building  
in Wood Soft Metal, Brass and Iron.

EDWARD A. BOLMES.

GEORGE G. COFFIN.

**BOLMES & COFFIN,**  
Hardware Manufacturers' Agents

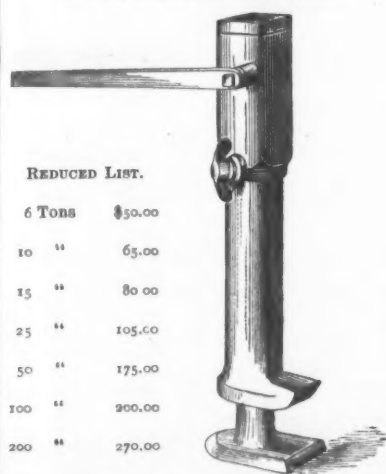
DOMESTIC AND EXPORT TRADE.

Correspondence Solicited.

No. 104 Chambers St., New York.

## TANGYE'S PATENT Hydraulic Lifting Jacks.

Cheapest Jack in the Market.



REDUCED LIST.

6 Tons	\$50.00
10 "	65.00
15 "	80.00
25 "	105.00
50 "	175.00
100 "	300.00
200 "	270.00

Send for list of other sizes and discounts. Makers  
of Hydraulic Punching Bears, Girder Testers, Rail  
Benders, &c.

**McCOY & SANDERS,**  
26 Warren Street, N. Y.

**ALFRED F. BRAINERD,**  
Analytical Chemist & Mining Engineer,  
BIRMINGHAM, ALA.

## THE PARAGON PRUNING SAW,

With Convex and Concave Cutting Edges.



Patented April 1st, 1884.

THRUST CUT ON THE CONVEX EDGE. DRAW CUT ON THE CONCAVE EDGE.

A FAIR TRIAL WILL DEMONSTRATE THAT

THIS IS THE BEST DOUBLE-EDGED SAW FOR TREES OR VINES.

**WHEELER, MADDEN & CLEMSON,** Middletown, N. Y.

**VIRGINIA NAIL AND IRON WORKS COMPANY,**  
LYNCHBURGH VIRGINIA.

NAILS and Bar Iron of Superior Finish, made exclusively from Pig Iron.

PATENTED ARTICLES OF  
**MALLEABLE IRON,**  
Hammer's M. I. Hanging Lamps.



B. Size.  
For Sale by all the principal Hardware Dealers.

Send for price list.  
Malleable Iron Castings of superior quality  
and Hardware Specialties in Malleable  
Iron made to order.

**HAMMER & CO.,**  
Branford, Conn.



**WM. MANN, JR., & CO.,**  
LEWISTOWN, PA.,  
Manufacturers of  
**RED WARRIOR AXES,**  
BROAD AXES,  
Adzes,  
Broad Hatchets,  
Spanish Axes  
and Tools.  
Branch Office,  
104 Chambers St., N. Y.  
**BOLMES & COFFIN,**  
Managers.

**OHIO CLIP WORKS,**  
Westville, Ohio,

Sole Manufacturers of the  
"BAKER" CLIP,  
For Singletrees, Heavy Axles etc. "Baker" Lap  
Links, "Baker" Oval Lap Rings, Ferrules and Hooks,  
Neck Yoke Irons, etc. Best Goods Made. Ask for them  
where you buy your Hardware, or send for Prices &c.

**The T. H. Bullock**  
BELLOWS The Best for the Money.  
Cleveland, Ohio. **FORGES**

**MERIDEN MALLEABLE IRON CO.,**  
MERIDEN, CONN.,  
Manufacturers of a Full Line of the Latest Improved  
**Patent Adjustable Iron Planes.**

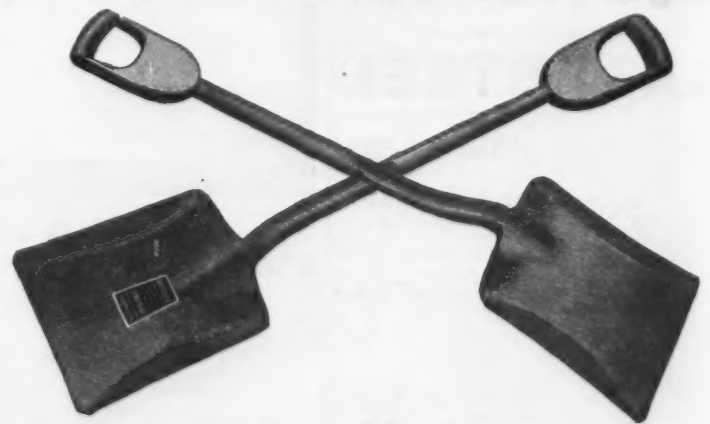
THE BEST NOW IN THE MARKET.  
Send for Full Descriptive Catalogue.  
New York Office, 37 Barclay St. Boston Office, 147 Franklin St.

**TELEPHONES SOLD.**  
Don't pay exorbitant rental fees to  
the Bell Telephone Monopoly to use  
their Telephones on lines less than  
two miles in length. A few months'  
rental buys a first-class Telephone  
that is no infringement, and works  
splendid on lines for private use on  
any kind of wire, and works good in  
stormy weather. It makes homes  
pleasant; annihilates time; prevents  
burglaries; saves many steps, and is  
just what every business man and far-  
mer should have to connect stores, houses, depots, fac-  
tories, colleges, etc., etc. The only practicable and reliable  
Telephone that is sold outright and warranted to work.  
Chance for agents. No previous experience required.  
Circulars free. **WM. L. NORTON,** Buffalo, N. Y.

**NEWSPAPER ADVERTISING**  
A book of 100 pages. The  
best book for an advertiser  
to consult, be he experi-  
enced or otherwise. It con-  
tains lists of newspapers  
and estimates of the cost  
of advertising. The adver-  
tiser who wants to spend one dollar finds in it the in-  
formation he requires, while for him who will invest  
one hundred thousand dollars in advertising a scheme  
is indicated which will meet his every requirement,  
or can be made to do so by slight changes easily ar-  
rived at by correspondence. One hundred and fifty-  
three editions have been issued. Sent, postpaid, to  
any address for 10 cents. Apply to **GEO. P. ROWELL**  
& CO., NEWSPAPER ADVERTISING BUREAU, 10  
Spruce St. (Printing House Sq.), New York.

**HUSSEY, BINNS & CO., LIMITED,**  
Pittsburgh, Pa.,

Make a specialty of  
Railroad, Contractors' and Miners'



Also a full line of  
**SHOVELS, SPADES and SCOOPS**  
for the  
HARDWARE TRADE.

**COMMON SENSE POST HOLE DIGGERS,**  
**COLD CHISELS, PUNCHES.**

**WOOD, COAL and STONE WEDGES.**

Prices quoted on application.



# GALLOWAY BOILER

IMPROVED UNDER PATENTS OF 1875 AND 1876.

Safety, Economy in Fuel, Low Cost of Maintenance, Dry Steam without Superheating, Large Reserve Power,

ARE THE ADVANTAGES OFFERED BY THIS BOILER IN A PRE-EMINENT DEGREE.

3000 Horse-Power in Progress and for Immediate Delivery. Correspondence Solicited.

EDGE MOOR IRON COMPANY,

SOLE LICENSEE AND MANUFACTURER FOR THE UNITED STATES,

POST OFFICE, WILMINGTON, DELAWARE.

Philadelphia Office, 1600 HAMILTON STREET.

New York Office, 79 LIBERTY STREET.

WM. SELLERS, Pres. JNO. SELLERS, Jr., Vice-Pres. ELI GARRETT, Sec. and Treas. GEO. H. SELLERS, Gen. Supt.

# BELLAIRE STEEL NAILS

MANUFACTURED BY THE

BELLAIRE NAIL WORKS,

ALSO

STEEL SLABS FOR NAILS.

OFFICE AND WORKS,

BELLAIRE, OHIO.

MANUFACTURERS OF AND DEALERS IN ALL KINDS OF

## FOUNDRY-FACINGS

PLUMBAGO OR BLACK LEAD

For All Purposes.

ALSO SHIPPERS OF THE CELEBRATED

### CINCINNATI MOLDING SANDS

For Stove Plate, Heavy and Light Machinery, Agricultural and Brass Work.

Agents for MONK'S CELEBRATED MOLDERS' TOOLS.

Send for Illustrated Catalogue and Price List. No charge for Samples.



EAGLE

THE LARGEST FACING MILLS IN THE WORLD. Capacity, 650 Barrels Per Day.

## FOUNDRY-SUPPLIES

MILLS

### HEAVY MACHINERY

AND FINE

### STOVE PLATE FACINGS

A Specialty.

S. OBERMAYER FOUNDRY SUPPLY MFG. CO.,

CINCINNATI, OHIO.

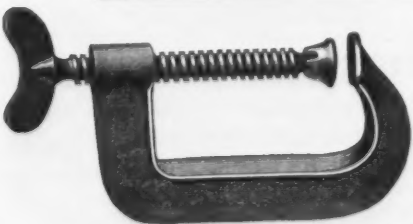
Mount Carmel Ox Shoes,

WITH STEEL TOE CALKS.

The Best and Cheapest Shoes Made.

Warranted to Outwear Any Other Shoe.

Six Sizes Each. Blunt and Sharp Calk.



Eagle Screw Clamps,

WITH BALL and SOCKET SWIVEL.

Ten Sizes. To Open.

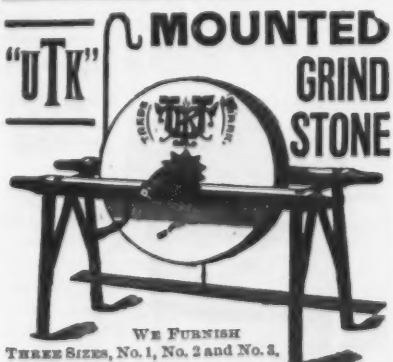
2, 2 1/2, 3, 4, 5, 6, 7, 8, 10, 12 Inches.

Coach & Carriage Hardware & Fine Mountings.

Malleable Iron and Brass Castings.

Correspondence solicited.

WOODRUFF, MILLER & CO., Mfrs., Mount Carmel, Conn., U. S. A.



WE FURNISH THREE SIZES, No. 1, No. 2 and No. 3.

The Stone is best quality Berea Grit. We claim the finest Mounted Grind Stone ever put upon the market. The legs are wrought iron, the hangers malleable iron, painted black. The wood beams and treadle are painted bright vermilion. The malleable shafts will interchange with any stone; easily and quickly put in. We ship knocked down in three parts, viz. Stone, Woods, Irons. Send for samples and prices.

J. M. CHILDS & CO., Manufacturers, UTICA, N. Y.



Bright Metal Cages, in Brass, Bronze and Silver Plate.

NEW AND BEAUTIFUL DESIGNS JUST OUT.

We also Manufacture Brass and Bronze Show Stands for Fancy Goods. Catalogues Mailed Free.



The Original Inventors and Manufacturers of the

"OSBORN"

## Latest Legal Decisions.

PARTNERSHIP—TRUST MONEY IMPROPERLY BROUGHT INTO THE FIRM.

M., who had been appointed receiver of an insolvent partnership, put into his own firm, with his partner's knowledge, a large sum of the funds in his hands, and, though he was repaid by his firm, he converted to his own use a large amount of the money. For the deficiency in his accounts the firm were sued, but on the trial they defeated the plaintiff, who took the case—Ryan vs. Morrill—to the Court of Appeals of Kentucky, where the judgment was reversed. Judge Fryor, in the opinion, said: "Both partners, with a knowledge of the trust, used the money as capital in their business, and, when unaccounted for, the only response is that the money was repaid to one of the members of the firm and by him converted to his own use, the one partner attempting to exempt himself from liability by showing that the firm had accounted for the fund by paying the money to his copartner. But where the trustee is a member of the firm, and the trust fund is used in the firm business, the firm must account for it."

SALE OF GOODS NOT IN STORE.

H., who was a brewer, went to the storerooms of P. to buy three brewery trucks, the cost of which exceeded \$50. But P. did not have these wagons, and being unable to make them in time he ordered them to be sent to him for H., with his knowledge and consent, from a manufacturer in another town. The trucks were received by P. and paid for by him, and some alterations were made in them at his request, and a painter employed by H. painted on them his name and business at the storeroom of P. H. refused to take the trucks, and in an action brought by P. to recover the price of them H. set up the plea that he was not bound by his order, as it was not in writing. In this case—Pawelski vs. Hargreaves—the plaintiff recovered, and the defendant carried the judgment to the Court of Errors and Appeals of New Jersey, where it was reversed. Judge Scudder, in the opinion, said: "The plaintiff seeks to take this order for the trucks out of the operation of the statute of frauds by setting up that he was the agent of the defendant to buy them, and that the alterations made were evidence of delivery and acceptance, but we cannot agree with him. The trucks were existing at the time they were ordered, and were not to be made according to order, nor were they things distinguished from the general business of the plaintiff. They were in the direct line of his work and wares, and with that knowledge the defendant sought him to obtain the trucks. Whether these articles which were needed were standing in the storeroom of the plaintiff ready for delivery with slight alterations and adaptations, or whether they were in the storerooms of a business correspondent in a distant city, who was ready to sell and forward the goods to them on their credit, without knowing or caring who their customer might be, can make but little difference. The result would be in either case a transfer for a price from the plaintiff to the defendant of chattels in which the defendant had no previous property, and, according to the rule as formulated by Mr. Benjamin in his book on sales, this would be a contract for the sale of a chattel within the statute of frauds. It is claimed that the difference between the price paid for these trucks and that charged for them would be their commission for buying, but we consider it as a profit on the transaction. This transaction was clearly a contract of sale within the statute of frauds, and as it was not in writing the plaintiff cannot recover."

TRADE-MARK—USE OF OWN NAME.

The manufacturers of silver-plated flatware, as knives, forks and spoons, who use the words "Rogers & Bros., A 1" as their trade-mark, sued for an injunction to prevent other manufacturers of this ware who stamped their goods "C. Rogers & Bros., A 1," from using the word "Rogers," as it was their trade-mark. The trial court denied the injunction on the ground that the defendants' use of their own name was fair and honest and in the ordinary course of business. The decree in this case—Rogers vs. Rogers—was carried to the Supreme Court of Errors of Connecticut, where it was affirmed. Judge Stoddard, in the opinion, said: "In the cases where the use of one's own name was restrained it was shown that there was a conscious, intentional, fraudulent misrepresentation on the part of the defendant, or that there was a combination of the name with other marks, characters, figures and form, and arrangement of circulars, advertisements, &c., such as to amount to a false representation. We think there is neither authority nor reason in support of the doctrine that the fair and honest use of one's name can be enjoined, when it is used in the ordinary course of business, in the way and manner in which other manufacturers of similar goods are accustomed to use their own names in the preparation for the sale of goods. Such a rule would operate in restraint of trade and prohibit a person from using the ordinary means which all are entitled to in the prosecution of business enterprises. Such a use contains no element of false representation or personation in any just and true sense, and while it may be true that a possibility exists that the goods of one will be purchased to some extent by persons who know no distinction, or by the few who suppose them to be the goods of the other, this condition of things is inevitable in trade and commerce, inhering in the nature of things, and attaches in kind, if not in degree, in all cases where a manufacturer sends goods of any particular description, but without distinguishing mark, into a district or country where such goods were before unknown, and establishes a reputation there as the manufacturer and vendor of such goods."

BILL OF LADING.

Goods were shipped upon a bill of lading which provided that the carrier should not be liable if any loss resulted from the heat. There was an injury to the goods from the heat, and the owners sued to recover for the damage, on the ground that the loss resulted from the negligence of the carrier, as they

were put in the forward hold, where they were unduly exposed to the heat, though the packages were labeled "Must not be put in the hold;" "This side must be kept up;" "Must be kept in a cool place." It was not shown that the attention of the carrier was called to these directions. The carrier insisted that the hold was a cool place, where they stowed butter and cheese. In this suit—National Bureau of Engraving and Mfg. Co. vs. the New Orleans, a libel filed in the United States Circuit Court, Eastern District of Louisiana—the libellant was defeated. Judge Pardee, in dismissing the libel, said: "The stipulation in the bill of lading against liability to loss by heat is a lawful condition, and unless it is shown by the libellant that the loss resulted from the negligence of the carrier he cannot recover. The rule is well settled that if the bill of lading is silent as to the mode of storing the goods they must be carried under the deck. And it has been determined that parol evidence will not be received to show that goods were to be carried on deck. In that case the carrier endeavored to show that he was authorized to carry the freight on deck, and, if he cannot protect himself by such proof, clearly he cannot be bound by it. Here the carrier is fully protected by the bill of lading, the shipper not proving any negligence."

## TRADE PUBLICATIONS.

Boiler-Makers' Materials.

Joseph T. Ryerson & Son, 47 North Clinton street, Chicago, Ill., have issued a stock sheet of boiler-makers' material now in their warehouse. This sheet is presented with the purpose of supplying promptly any possible demand, with little trouble and with good materials at regular prices. Messrs. Ryerson & Son, we understand, have a large and constant correspondence with the leading mills and are accordingly well enabled to give satisfaction.

Pulleys.

The Medart Patent Pulley Co., of St. Louis, Mo., have issued a new catalogue of 36 pages, in which they present at length different matters of interest connected with their wrought rim pulleys. These pulleys have now been before the public seven years and have accordingly passed beyond the experimental stage. For the convenience of customers to whose advantage it is to purchase in those markets the company have established stores in Chicago and Cincinnati, at which they carry a full line of goods, including from 3000 to 4000 pulleys at each store, together with a complete assortment of iron bushings, making a stock equal to from 15,000 to 20,000 pulleys at each place.

Another catalogue issued by the Standard Foundry Co., of St. Louis, Mo., gives attention to machine molded pulleys, brackets, hangers, fire fronts, &c. It is fully illustrated and contains extended price lists and tables of sizes. The company also announce that they have thoroughly fitted both their foundry and machine shop with the latest and most improved special pulley machinery, and by putting up large quantities of stock at a time get it out at a low cost. They will furnish estimates for any size pulley or fly-wheel not over 10 feet diameter, on application, either in the rough or finished. Each of their machine patterns is furnished with three sets of arms—light, medium and heavy; this gives a properly proportioned arm for each width of face.

Feed-Water Heaters.

Wm. Baragwanath & Son, of Chicago, Ill., have sent us a catalogue setting forth the advantages of their feed-water boiler and purifier. A number of engravings are given, together with description explaining the general arrangement, connections, &c. An inclosed circular furnishes an illustration of the Nagle boiler feed-pump and gives also a price list, table of sizes, &c.

General Machinery.

An illustrated catalogue and price list just sent us by D. B. Cruickshank, of Providence, R. I., refers to steam engines, boilers, injectors, governors, wood and iron working machinery, &c. It embraces 16 pages and contains considerable matter of trade interest.

Steam Engines.

Barney & Kilby, of Sandusky, Ohio, have sent us a catalogue devoted principally to the Neuert automatic engine built by them. Elevations and a sectional view are given and a detailed description is furnished. Attention is also given to their adjustable cut-off engine, their vertical marine engine and several forms of boilers turned out at their works.

Air Compressors.

An interesting catalogue just issued by the Norwalk Iron Works Co., of South Norwalk, Conn., gives a detailed account of the various compressors built by them. It covers 48 pages and is replete with illustrations and valuable data bearing on the subject of compressing machinery. The Norwalk air compressor has been specially designed for driving coal cutters, rock drills, pumps, engines and pneumatic locomotives, and for all mining purposes.

Wire Nail Machines.

The Birmingham Iron Foundry, of Birmingham, Conn., have issued a circular illustrating and briefly describing Hardman's wire nail machines, of which they are the builders. Top and front views are shown and a detailed table is given for convenience in ordering, from which can be found the number of the machine and the number of nails which it turns out per minute; the gauge of the wire, extreme length of nail, space required, the diameters and faces of the pulleys, the horse-power required for working, the weight of each machine and its price.



# WHITE MOUNTAIN FREEZER COMPANY,

Nashua, N. H., U. S. A.

WE LEAD. \* COMPETITION FOLLOWS.



HAND OR POWER FREEZER.

Sizes, 25 and 50 Quarts.

Just the machine for confectioners requiring a first-class Freezer, and, if desired, a fly-wheel can be substituted in place of Pulley, and the Freezer operated by Hand.



NEW PLATFORM FREEZER.

Sizes, 15, 20 and 25 Quarts.

Especially adapted to use of Hotels, Restaurants and Ice Cream Parlors.

By substituting pulley in place of fly-wheel it can be operated by power.



Sands' Patent Freezer  
Clamp or Holder.

A device for holding the tub firmly while freezing.

## SANDS' PATENT TRIPLE MOTION "WHITE MOUNTAIN" ICE CREAM FREEZER STANDS AT THE HEAD

IN POINT OF

*Mechanical Construction, Simplicity of Operation, Durability, and, above all, Excellence of Production.*

The only Freezer ever made having three distinct motions, thereby producing FINER, SMOOTHER CREAM THAN ANY OTHER FREEZER ON THE MARKET.

Acknowledged by every one to be the best in the world. Over 300,000 in use to-day.

The Tubs are chemically filled, and water proof.

Outside Irons Galvanized, but all inside the can COATED WITH PURE BLOCK TIN.

"Never put anything into the human stomach prepared in vessels coated with zinc."—*The Metal Worker.*

Packing Tubs and Packing Cans, all sizes, Wholesale and Retail.

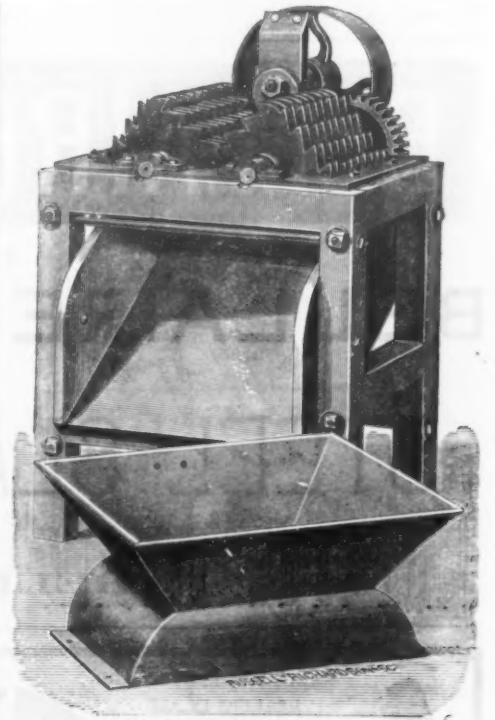
For Illustrated Catalogue, Price List and Trade Discounts, address the

MANUFACTURERS,

### WHITE MOUNTAIN FREEZER CO.

NASHUA, N. H., U. S. A.

*Special Attention Given Export Orders.*



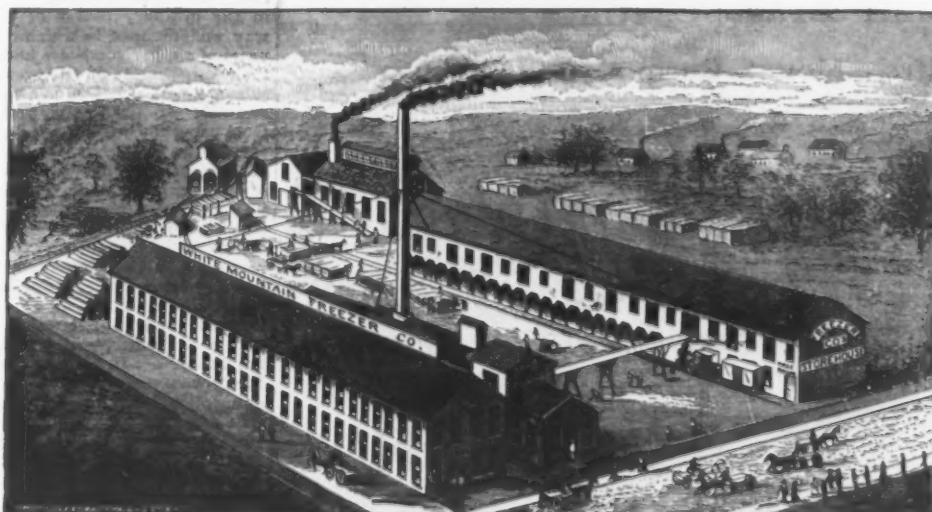
Sands' Large Hand or Power Ice Crusher.

Capable of crushing tons of ice daily.  
Can be adjusted to break fine or coarse.



SANDS' FAMILY ICE CRUSHER.

We have introduced a larger size Crusher, operated upon same principle as above, for use of Hotels, Ice Cream Saloons, &c.



HOME OF THE "WHITE MOUNTAIN."

The Largest Freezer Works in the World.



"White Mountain" Hand Freezer.

Ready to Operate.

Sizes, 2, 3, 4, 6, 8, 10, 15, 20, 25 and 50 Quarts.



## THE WEEK.

The taxable valuation of Allegheny County, Pa., in which Pittsburgh is situated, has increased to \$242,800,000, as against \$235,688,000 in 1885. Pittsburgh alone is valued at \$121,600,000; increase, \$7,639,000.

For the first time in two years a lot of cotton, comprising 1000 bales, has been sent down the Mississippi to New Orleans from St. Louis.

An item of nearly \$100,000 in the Agricultural Appropriation bill reported in Congress is designed for the purchase of machinery in Germany which had been successfully used in the manufacture of beet-root sugar. It is supposed to be equally suited to the production of sugar from cane and sorghum.

Edward G. Brown, a contractor, who built the Newark and Raritan Bay bridges and other famous structures, died at Elizabeth, N. J., last week, aged 70 years. Deceased was born in Maine.

An Elevated Electric Railway bill, passed by the City Councils of St. Louis, was vetoed by Mayor Francis, who says in his message: "An elevated railway, with electricity as the exclusive motive-power, to be restricted to the carrying of passengers, would be a credit to the city and undoubtedly a benefit to the people at large; but the rights of property damaged by its construction should be securely protected, and the bill should be so framed as to leave no question as to the exclusion of steam as a motor or as to the possibility of its being converted into a freight road while in the hands of its projectors or their successors."

The St. Louis National Bank Building about to be erected will not have a particle of any kind of combustible material used in its construction.

Four large apartment houses on Broadway were sold under foreclosure last week, to satisfy mortgages held by the Seamen's Savings Bank. The Newport was purchased for \$135,000, or \$10,000 in excess of the mortgage; the Strathmore by Henry Beach for \$142,000, the Adelphi and Adelphi Hall by Ottinger Bros. for \$10,000 and \$74,000 respectively. The Strathmore rents for \$23,550; the Newport, \$19,120; the Adelphi, \$3540, and Adelphi Hall, \$5490.

In the Assembly at Albany last week Mr. Hardenburg's bill, providing that the piece-price plan for the employment of convicts shall be adopted when existing contracts expire, was lost—yeas, 52; nays, 62—so the effort to effect a change has failed for this year. The result of this defeat, according to Mr. Baker, of Steuben County, will be to impose from \$500,000 to \$1,000,000 taxes upon the State during the coming year.

The loss of the Oregon was the subject of several pertinent inquiries in the British House of Commons last week. The substance of the matters brought out is that the ten life-boats of the ill-fated steamer would carry but 365 of her nearly 900 passengers, and hence that if she had gone down in mid-ocean more than one-half her passengers could not have been taken in her boats. And yet, notwithstanding this startling deficiency, the Cunarder's lifeboat accommodations were admitted to have been largely in excess of the English statutory requirements.

The marine plow designed by General Stone to deepen Gedney's Channel is now lying rusting on the dock at the foot of West Thirteenth street, New York.

The American clipper Henry B. Hyde arrived at Sandy Hook in 22 days from Liverpool.

The Canadian Pacific Railway Co. are laying the foundation of a cantilever bridge across the St. Lawrence, at Lachine, to cost \$250,000, and to be completed in December. It will be supported by six solid stone piers.

Data just at hand bearing upon the development of cotton goods manufacture in India makes a show that is equally as striking as the growth of agricultural interests in that section. In the year 1875 there were only 53 mills, with a total of 10,538 looms and 1,289,706 spindles. Each following year has witnessed an addition to the number, until at the close of 1885 there were no less than 87 mills, with 16,537 looms and 2,158,706 spindles.

The exportation of unwashed wool from the Argentine Republic last year was to the value of \$32,000,000. Wool growing in that country is rapidly increasing in importance.

By a decision of the Secretary of the Interior nearly 2,500,000 acres of land on the line of the Atlantic and Pacific Railroad Co., extending 384 miles back from San Francisco, are restored to the public domain.

Englishmen are not in the least scared by the enormous cost of the Canadian Pacific Railway, so long as it may result in building up British trade. The London Chamber of Commerce petitions the Government to support the railway and the proposed steamship line to Australia and the East.

A dispatch from Ottawa to the consul-general at Halifax says: "American fishing vessels have no right whatever to enter Canadian bays or harbors except to obtain wood or water. Instructions to that effect issued."

San Francisco papers report extremely low rates of freight to New York. On some goods particular shippers have been cut down

to 40 cents per 100 pounds, about as low as the clipper ships. The *Commercial Herald* thinks the man who imports iron, steel or hardware at these rates cannot make much of a mistake.

Local street improvements in New York City authorized by the Board of Aldermen encounter various and unexpected hindrances both from the Legislature and courts. Following closely on the Cantor bill signed by the Governor, which was fatal to an extensive "gridiron" project, the General Term of the Supreme Court on Friday decided against the cable railway franchise recently granted. Three commissioners appointed by the court recommended that the road should be built, and the railway officials then asked the court to confirm their report. After five months' deliberation the court announced its decision, Judges Daniels, Davis and Brady each writing an opinion. They differed in minor respects, but all arrived at the same conclusion—that the report of the commissioners should not be confirmed. Judge Daniels, in his opinion, says: "Increased facilities for travel through the city are undoubtedly required, but when they are adopted or permitted they should be of that description which will surely afford to the public the conveniences which have become essential to their movements, as well as prove reasonably healthful and safe. This invention has not yet attained that state of certainty which will render it probable that these objects can be secured by means of its adoption and use."

Manager Emory, of the New York Steam Co., requires each person employed by them to subscribe to an agreement which he believes will prevent strikes hereafter. The foundation of the scheme is the organization of a benevolent society among the employees. When a new employee is engaged he is required to turn in a certain per cent. of his earnings immediately as a sort of initiation fee. If he has not any money, then the company either lend or give it to him. Interest on the fund will be used to support the association. If the men go out on strike, then they resign their right to a share in the fund. When an employee is sick he draws a certain amount every week. The charge of the fund and distribution of the proceeds will be divided between the employees and the company.

The blind yacht builder, J. B. Herreshoff, of Bristol, R. I., visited the National Museum, at Washington, last week, accompanied by a gentleman who minutely described the objects in the cases and answered numerous questions as to their color, proportions and utility. It was a remarkable spectacle to observe the minuteness with which the sightless man studied the curiosities through the eyes of his companion. He is a driving man of business. In a few hours, it is said, he sold a couple of vessels to Secretary Whitney for the use of the navy, and received orders for two others yet to be built. He will be remembered as the constructor of the yacht *Priscilla* and other fleet craft.

Still another grand scheme for the improvement of New York City seeks the approval of the Legislature. It is called the Terminal Underground Railroad, but is really an old project revived under a new name. It is to have \$5,000,000 of capital, and is to begin in Chambers street and reach by means of a tunnel under buildings and streets to Forty-second street, following Elm, Spring, Marion, Mulberry and Great Jones streets, Lafayette place, Eighth street and Fourth avenue, with branches to the Fulton, South, Thirty-fourth street and Williamsburg ferries. The road is to be 6 miles long, 3½ miles north and south, and 2½ miles of branches. With the proposed Arcade Railway the underground system would be in some sense a counterpart of the elevated system.

The *Marine Journal* indulges in a complacent line of remark favorable to American shipbuilders when it says: "Since 1854 the great disasters at sea have been wholly confined to foreign steamers."

The Harlan & Hollingsworth Co., of Wilmington, have won the suit which was brought against them by the owners of the steamboat *Excelsior* for breakage of walking beam. The latter claimed that it broke through defective construction and wanted \$20,000 damages.

The New York Dock Department has moved to its new building on Pier A, North River. It is of granite masonry, and the foundations of some of the stone buttresses are nearly 50 feet below the river bottom. Though not quite so large it is of the same style as the adjoining pier, No. 1, which is the only other stone pier on the water front. The pier cost \$80,000, making the total cost about \$120,000. The building is of brick, iron and terra-cotta, and that portion adjoining the bulkhead is made fire-proof, and will be used for storing the records of the department.

The Chinese from British Columbia and San Francisco are being colonized in Mexico, the Government paying \$35 per head to the company engaged in this business, but whether they will consent to labor for the Mexican people is doubtful.

There are a dozen steamers navigating lakes and rivers in the interior of Africa, whither they have been transported overland in fragments at great expense. They were nearly all built in England. Small as the steamboats are compared with our river boats, they weigh from 25,000 to 50,000

pounds apiece. A few of the Upper Congo steamers were mounted in sections on steel wagons with broad tires, and Mr. Stanley tells of "the awful toil of dragging these heavy steamers overland before they are set afloat above the cataracts."

Office rents down town are about the same as last year, despite the large additions recently made to accommodations of this character. Nearly all the new buildings are full and others are near completion, but it is not certain that tenants will be so easily found. Rents in the hardware district are about the same. On Broadway there are fewer vacant stores than before for several years.

Water-tight mail bags are advocated for ocean service, with some strong arguments in their favor.

The German Reichstag has read a second time the bill for the construction of a canal from the Baltic to the German Ocean.

The Italian Parliament has passed an act somewhat akin to the French shipping bounty law. It provides for the grant of bounties of \$5.76 a ton for iron and steel ships built and registered in Italy, \$1.02 per indicated horse-power on machinery and 58 cents per 100 pounds weight on boilers; \$2.40 per ton on coal brought to Italy in Italian ships from ports lying outside the Straits of Gibraltar, provided that the cargo is not less than three-fifths of the ship's burden, and a bounty on navigation of 13 cents per net ton for every 1000 miles run from Italy to non-European ports lying beyond the Suez Canal and the Straits of Gibraltar.

The Secretary of the Treasury, in a reply to the House resolutions inquiring what sum is involved in the pending suits to recover duties illegally collected in New York, says that since 1866 the amount probably exceeds \$10,000,000 independent of the cases under the cartons decision, now estimated at \$11,000,000. During the 30 years the inadequacy of the judicial force and that of the District Attorney's and Collector's offices has been responsible for the delay, until at the present time over 2300 cases have accumulated. He suggests immediate legislation by Congress authorizing the appointment of an additional Circuit Judge, with such assistants as may be needed, for the trial of suits thus described. District Attorney Dorsheimer says the proposed increase of judicial and executive force would place the business, otherwise apparently hopeless, under complete control, brush away the arrears and provide for satisfactorily dealing with new suits as they arise.

The manufacturers of Rhode Island, anticipating unfriendly legislation and labor agitation injurious to their interests, formed about two months ago an organization known as The Slater Club, which includes about all the manufacturers of any account in the State. According to report they have agreed to stand by each other's interests in any contest, financially and otherwise. This most important feature is a "black list"—that is, a list of persons who may quit the employment of any mill in the State for causes which may be offensive to the employer. This list is to be transmitted to other Rhode Island mills in the combination, and the persons so listed are to be excluded from employment in the mills, and thus compelled to leave the State or seek some other line of work.

The present debt of Boston is: City debt, gross, \$42,924,332.04; county debt, gross, \$850,000; total gross debt, \$43,774,332.04. The sinking funds now amount to \$18,482,753.41, and the net city debt is therefore at present \$25,291,578.63. The net city debt in 1876 was \$8,055,626.66, showing a decrease of \$2,744,951.03.

General Master Workman Powderly, it seems, began his working life as a switch-tender. Mr. Hoxie, manager of the Gould system of railroads in the Southwest, was at one time hostler in a hotel near Des Moines. Mr. Gould earned his first money as a map peddler.

Within the last week the Governors of four States—Missouri, Kansas, Arkansas and Texas—issued proclamations signifying their intention to enforce the laws for the preservation of order, and at several points the militia were held in readiness. United States troops were sent forward from Governor's Island and Fort Snelling.

The responsibility of railroad companies for the delivery of merchandise committed to their care was the subject of a decision at St. Louis, 25th ult., in the case of Wolfe & Goode vs. the Missouri Pacific Railroad Co. The plaintiffs received a consignment of 750 tons of wire from the Cambria Iron Co., of Johnstown, Pa., via the Bridge and Tunnel Co., which turned the wire over to one Henry Fuchs, who, it was alleged, was authorized to receive it by the Pennsylvania company. The railroad company contended that Wolfe & Goode had no interest in the wire, but that it was consigned to them to facilitate its delivery to Fuchs. The judge stated, however, that the evidence showed that Wolfe & Goode never assented to the delivery of the wire to Fuchs, nor did the evidence show that the title of the wire had passed to Fuchs. It might be that the Cambria Iron Co. violated their contract of sale in not delivering the goods, but that was a matter with which the railroad company had no concern. It would not do to hold that the common carrier could determine where

the vender shall deliver the goods—that was a question which the vender must decide for himself at his own risk. Judgment was awarded in favor of the plaintiffs for \$7028.

On account of recent railway extensions in the dairy districts near New York City, the price of milk the coming season will be low, and farmers view the prospect with alarm.

Between 6000 and 7000 hands have been idle in Cohoes over two weeks, in consequence of the strike in the knitting mills.

The sunken steamer *Missouri*, wrecked off Holyhead, was blown up with gun cotton, and her cargo is being successfully discharged.

Russia either finished or had in various stages of completion last year 23 vessels for her Baltic and Black Sea fleets, and considerable additions were made to her steel armor manufacturing.

The French Admiral Aube is devoting his energies to the development of torpedo warfare. In some recent experiments he found no difficulty in repeatedly striking the ironclad when going at full speed with torpedoes fired at any angle against her side, as well as when fired at her bow.

In his speech before the Senate committee at Albany in favor of repealing the Broadway railroad charter Roscoe Conkling said: "The basic maxim of good faith in engagements is this: Every promise shall be kept, and kept as he to whom it is made had a right to understand it."

The *San Francisco Chronicle* publishes reports from its correspondents all over the State with reference to crop prospects for the coming season, showing that the outlook for a heavy yield of wheat and barley is encouraging beyond precedent.

At Krupp's, in Essen, a railroad truck has just been built with 16 axles. It was made for the special purpose of transporting by rail a cannon which is 50 feet long and weighs nearly 136 tons, from Essen to Spezia, in Italy, by way of the St. Gothard Tunnel. The truck is 76 feet long and the axles are divided into groups of four, which easily adapt themselves to the curves in the road.

It is now almost certain that the Oregon was sunk by the schooner *Charles A. Morse*. A yawlboat recently picked up near the scene of disaster is recognized by her former captain as having belonged to her.

Bogus scissor grinders in the streets of New York ruin a great deal of cutlery by overheating, thus reducing steel to a condition little better than iron.

In the race for commercial supremacy Baltimore manages to hold its own tolerably well. Its dry-goods interest amounts to probably \$30,000,000, its canning industries reach \$25,000,000, its clothing about \$15,000,000, its groceries, coffee and tea about \$30,000,000, its grain and provisions about \$40,000,000, its cotton about \$20,000,000; yet none of these appear to have fared worse than similar interests in New York, Boston, Philadelphia or any of the other prominent cities.

## Jet Propulsion of Ships.

In view of the renewed experiments on the propulsion of ships by means of water or gas forced out under pressure, the following brief sketch, given by the *Revue Industrielle*, of the experiments carried out in Europe on this subject to early in 1885 proves interesting:

The experiments on the hydraulic propulsion of ships undertaken by Mr. Maginot last year have again called the attention of engineers to a question that has been the object of numerous researches. The first idea of this kind dates back to 1661. It was perhaps suggested by the well-known hydraulic tournaquet. Two centuries later (toward 1860) an effort was made at Seraing, Belgium, to apply centrifugal pumps to hydraulic propulsion. Serious comparative trials were made for the first time in England in 1866, when the Admiralty caused to be constructed, after plans by Ruthven, an armor-clad gunboat actuated by water jets placed at the load water line on each side of the vessel. The diameter of the apertures was 24 inches and the water was set in motion by a centrifugal pump actuated by 760-horse-power engines. This gunboat, the *Waterwitch*, had a speed of 9.3 knots and displaced 1161 tons. The velocity of the water that made its exit from the pump was measured in a clumsy way by means of a log thrown into the jet.

The *Viper*, a screw boat in all points comparable with the *Waterwitch*, displaced 1180 tons, and had a speed of 9.58 knots with an expenditure of 666 horse-power. The advantage, then, remained with the screw. These trials in the meantime attracted the attention of the Swedish Government, which in 1873 made a comparison of two similar torpedo-boats—one a screw propeller, and the other a vessel moved by hydraulic propulsion. These torpedo-boats measured 58 feet in length by 10½ in width, and gauged about 25 tons, with a power of 90 horses. The screw torpedo-boat had a speed of 10 knots. With a 78-horse-power turbine the hydraulic propeller had a speed of 8.12 knots. The following year Germany made some experiments with the Fleischer hydromotor without obtaining any satisfactory result. The steam acted directly upon the water. Two orifices, the action of which was intermittent, threw the steam in every direction. But this intermittent action produced a very bad effect upon the boat, and the expenditure of steam was enormous, and the speed obtained was but slight.

In 1882 the English Admiralty took up the experiments that it began in 1866, and an order was given to Mr. Thornycroft for 20

torpedo-boats of the second class. It was decided to try the Ruthven hydraulic propeller upon one of these. The dimensions of the screw torpedo-boat were as follows: Length, 63 feet; width, 7½ feet; draft, 3½ feet; displacement, 1230 tons. For the hydraulic propeller the engines were heavier, and the dimensions of the boat somewhat different. The length was 66 feet, the breadth the same, the draft 25 feet, and the displacement 14 tons. The water was expelled through a turbine running at the rate of 458 revolutions per minute.

The engines were of the compound type with surface condenser. The cylinders measured 12 and 8 inches in diameter, and the stroke of the piston was 12 inches. The suction-pipe was under the hull, and at about the center of it. The orifices, which were situated on each side, just over the load water line, were 9 inches in diameter. They were capable of throwing the water forward, backward and at right angles with the boat's axis. The pump discharged 1 ton of water per second, with a mean velocity of 34 feet per second and an expenditure of 167 horse-power. The speed obtained was 12.6 knots per hour. The pressure of the jet was measured by means of a dynamometer. A plate 13 inches square was mounted at the extremity of a lever connected with the dynamometer, and was inserted into the jet at different points in the section of the orifice. The mean pressure was nine-tenths that of the central pressure. The engines of the screw torpedo boat, which were much lighter, had cylinders 8 and 13 inches in diameter, and the stroke of the piston was 8 inches. They developed 170 horse-power, and gave a speed of 17 knots per hour.

The coefficient of the jet's performance—that is to say, the ratio of its disposable energy to the effective work of propulsion—was found to be equal to 0.71. The coefficient of the pump's performance was 0.46. The *Waterwitch* experiments gave 0.5 for the performance of the jet, and 0.55 for that of the pump. It will be seen, then, that the jet's performance was raised by Mr. Thornycroft from 0.5 to 0.71.

In screw vessels the engine's performance is 0.77, and that of the screw 0.65, thus giving 0.5 for the total performance. Allowing the same figure, 0.77, for the performance of an engine actuating a pump, 0.46 for the performance of the pump, and 0.75 for that of the jet, we have 0.254 as a total. These figures show us that the jet gives a better performance as a propeller than the screw, and that the superiority of the latter over hydraulic propulsion is merely due to the feeble performance of the pumps. By increasing the effective duty of the latter it would be possible, then, to greatly improve hydraulic propulsion. Things were in this state when Mr. Maginot began some researches with the pump of his invention. These researches attracted the attention of the French navy, and some experiments were performed in the presence of a State engineer.

The *Nautilus* was the boat used in these experiments. It had the following dimensions: Length, 46 feet, and width amidship, 6 feet. The mean draft was 1½. The Maginot pump is 23 inches in diameter at its widest part. Suction is effected through a tube taking water from beneath the keel nearly amidships. The water coming from this pump is forced into a sheet copper tuyere connected with the pump chamber and terminating in a nozzle 8½ inches in diameter, debouching under water at the stern of the boat. Diagonal tubes throwing water forward serve to back the ship, and tubes at right angles serve to turn her in either direction. The shaft of the pump is actuated directly by a vertical single-cylinder engine 8 inches in diameter and of 6 inch stroke. The advantages of hydraulic propulsion are numerous. It is applicable to the smallest drafts. It does away with the danger due to running aground or coming into contact with floating objects that often break screws. Finally, the running of the vessel under sail is in no wise interfered with by the jet propeller, while it is necessary to lift a screw through a well, or otherwise arrange it, due to its resistance, when the vessel is running under sail.

As may be seen from the figures that we have given, the total performance of this system amounts to 0.49 in the Chalon experiments. The experiments above alluded to gave the following results:

Numbers of experiments.	1	2	3	4
Revolutions per minute.....	240	357	425	518
Tm. Motive work in H. P.....	8.09	10.05	16.18	27
V. Speed of jet in meters per second.....	4.40	6.55	7.8	9.55
u. Speed of the boat in meters per second.....	2.46	3.30	3.83	4.24
.....	1.8	2	2.04	2.28
Q. Discharge in liters per second.....	302	300	355	435
Discharge per revolution.....	50	50	50	50
Performance of jet.....	0.60	0.60	0.66	0.80
Performance of pump.....	0.715	0.66	0.66	0.61
Performance total.....	0.425	0.40	0.435	0.49

The values of V were obtained by special piezometric methods. The maneuvers were effected by means of valves. A 180° revolution in situ was obtained in 45 seconds, and a complete stoppage at the end of a run of about 6 miles, the speed being about 8 miles per hour. If the *Nautilus* did not make very great speed during these experiments, it was due to her small dimensions and the imperfection of her form. The prow was too sharp in proportion to the length of the boat, and the after part lacked slenderness, while the body comprised a prismatic portion 5 feet long. The experiments noted above have been very favorably reported upon by the engineer who was delegated to witness them. It is the intention of the experimenters to construct a much larger boat before long, provided with an improved propeller.

A patent for an improvement in twin-cylinder single-acting engines has just been granted to Fawcett Plumb, of Streator, Ill. The object is to provide a more compact, simple and perfect valve movement and gear in connection with an engine of the above character, and to further provide an oil or water reservoir of improved construction in connection with the hollow liquid-tight base of the engine.



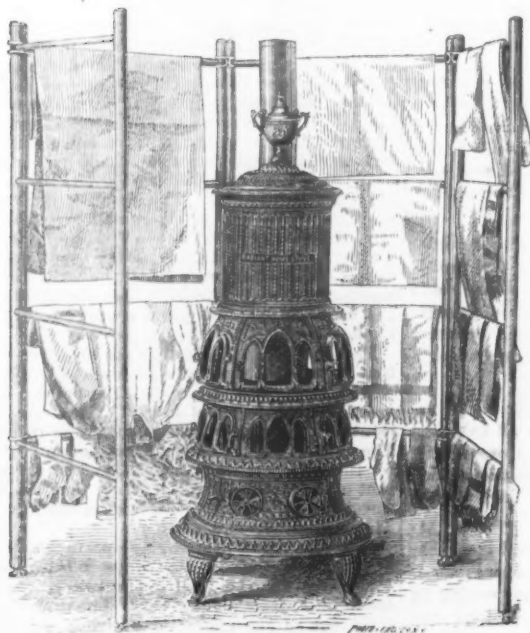
# THE F. F. ADAMS COMPANY, ERIE, PA.

## Patent Household Articles.

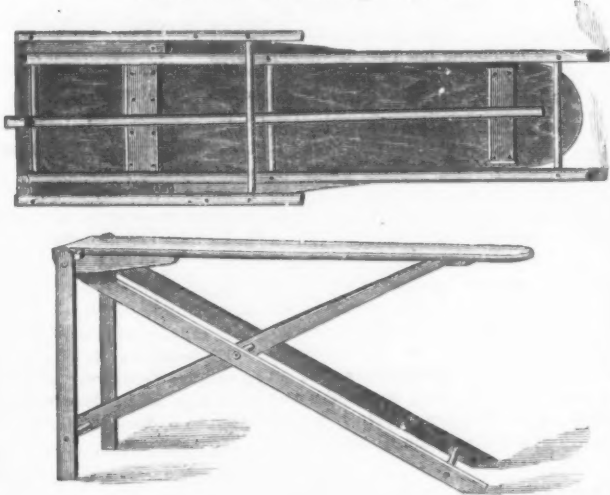
Send for Illustrated Catalogue of 1886.

Reversible Clothes Horse.

PATENTED.

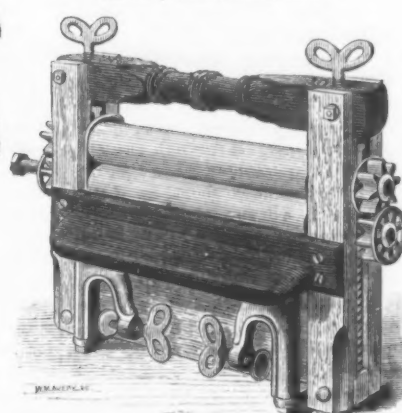


Adam's Ironing Table.



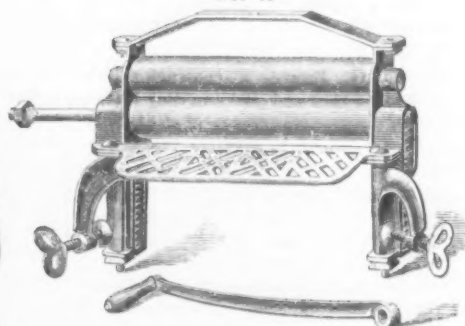
Keystone Wringer.

Laundry and Factory Size.



Our New Style.

NO. 11

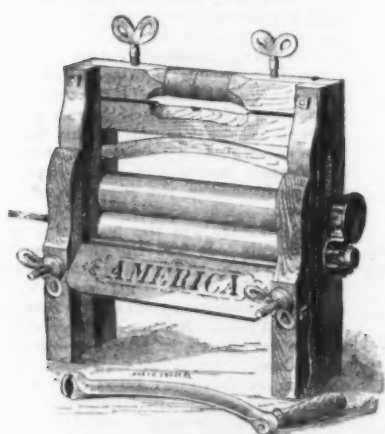


Adams Swing.



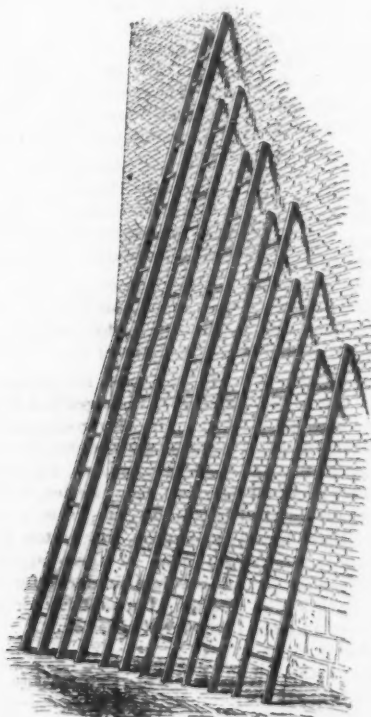
The America Wringer.

No. 8. FAMILY SIZE.



Common Ladders.

From 10 to 20 Feet.



Keystone Double Bench Wringer.

Price to the Trade, \$48.00 per Doz.



Lovell's Lock-Hinge Step Ladder.

Patented April 16, 1872, and March 11, 1873.



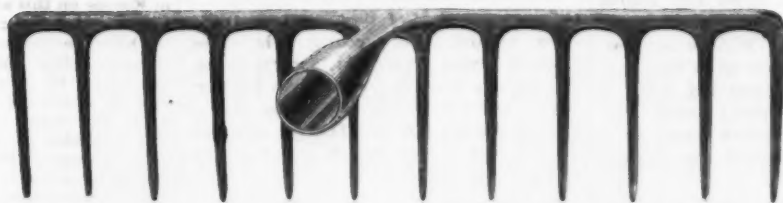
Lovell's Patent Extension Ladder.

Patented October 22, 1867, and August 4, 1874.



Keystone Socket Rake.

This is the only Socket Rake in the Market.



Ideal Mouse Trap.



Cyclone Mouse Trap.

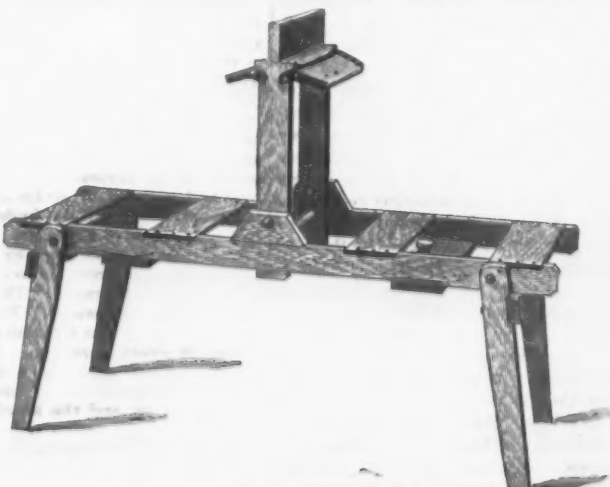
Patented November 6, 1883.



The Jungbluth Lawn and Street Sprinkler.



Adams Double Folding Wash Bench.



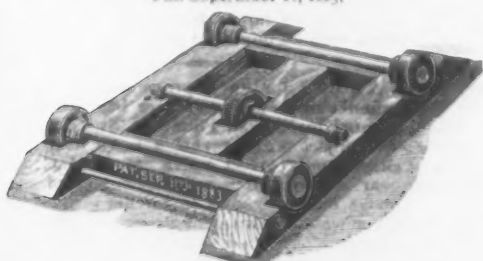
Adams Platform Truck,

SIX WHEELS.



The Adams Iron Wheel Truck.

Pat. September 11, 1883.





## MECHANICAL.

## Revolving Screens.

The Ottumwa Iron Works, of Ottumwa, Iowa, are putting on the market a new revolving screen, which we understand is rapidly coming into use in the Western States. A complete screen outfit as made by these works consists of the screen proper with its shaft and boxing arranged to receive the material while slowly revolving. The screen is slightly inclined, so as to readily effect discharge into a car or other receptacle. In addition to the screen there is a chain bucket elevator to raise the coal from the dump to the screen, and an engine for driving both. Power can, however, be taken from any available engine already in use. The screens are built either single or double, and are provided with wire cloth of suitable mesh to screen any size of coal desired.

## The Future of the Steam Engine.

Speaking of the changes that have been made in steam engines within the past 12 or 15 years, the London *Engineer* of recent date directs attention to several points which are worthy of the closest attention.

As regards the future improvement of the steam engine, says our contemporary, those who devote themselves to this consideration must, if they really desire to do good, bear in mind that improvement is essentially

lent machinery will or can pay. The prospects of much advance toward excellence in land steam engines are less promising. It is true the problem of locomotive improvement attracts some attention, but not so widely extended so far as practically tried devices are concerned; engineers rather seem inclined to await the results of Mr. Webb's and Mr. Worsdell's compounding system.

In fixed engines the least prospect of all of energetic attempts at improvement is to be found. Many things contribute to cause this. The action of steam users themselves, displayed in their intense desire to buy cheap engines, operate to hinder advance. There are too many steam users who simply want something that will work, and care for little else, to encourage the expenditure of money on costly experiments and expensive patterns. We are ourselves of opinion, while willingly subscribing to the dogma that engine-makers, like all other traders, must try and please their customers, that they ought in their own interests to refrain from spoiling them and degrading their own business or driving it entirely away into other hands by, for sake of a temporary gain, supplying really worthless articles. For, although such a policy may endure successfully for a time, it is certain ultimately to damage their reputation that when a "winter of discontent" comes in the shape of trade depression they will perish through having forfeited their good name in an at-

engine is jogging along at a quarter the speed it made the day before. Every intelligent engineer meets incidents of this kind every month, and knows how to account for their occurrence. The same laws apply to the rupture of a steam boiler that control the safety of a chainlink, yet the men who readily perceive a rational cause for a chain breaking yesterday fail to account in a natural way for a boiler exploding under ordinary working pressure and without warning.

No subject connected with the locomotive has received more careful attention from the Railway Master Mechanics' Association than the cause of boiler explosions, and the deliberate conclusion reached after years of patient investigation was that ordinary overpressure alone caused boilers to explode. A boiler works along safely for months or years after being built or thoroughly repaired, and some deteriorating agent keeps operating upon it unnoticed till a weak link in the shape of a corroded sheet or some broken stay-bolt gives way, and the boilers goes to pieces. It is satisfactory to notice that the labors of the various Master Mechanics' Committees on Boilers appear to have produced good results; for, although the number of locomotives in the United States has been increased materially since 1875, the number of boiler explosions reported have been greatly diminished. During the year 1875 there were reports made of 26 violent explosions of loco-

sent to a greater or less degree the disadvantage of producing wire-drawing at the moment of cut-off, inasmuch as the act of closing the steam passage takes time and presents a decreasing area for an increasing demand for steam. It occurred to Mr. James H. Man, the inventor of the new valve, that, if a valve be poised so as to be at all times free to close, the draft of the steam, passing through it toward the cylinder, would close the valve automatically under certain conditions as to velocity, weight and area. In other words, if a valve be proportioned to impede the flow of the steam, so as to cause a slight difference of pressures on either side of itself sufficient to overcome the weight of the valve, it will rise, and by closing the orifice give an instantaneous cut-off.

The application of this principle will be readily understood upon reference to our engravings. In the horizontal engines of moderate size built by the company the cut-off valve is made an adjunct to a distributing valve of the piston type. This valve is fitted with steam-tight rings, as shown, is driven by a fixed eccentric and has a constant travel, and does not in any way effect the control of the cut-off or the regulation of speed. This constant travel produces a constant lead, a constant compression and a constant release. The amount of compression is made sufficient to insure smooth running of the engine. From Figs. 2, 3 and 5 it will be seen that the piston-valves are furnished with

worst to be a kind of musical "clink," which by its rhythmical action is a sure indication of the correct working of the valves. The builders also write us that they have on exhibition some valves that have seated themselves over 40,000,000 times and yet the amount of wear is such that the finger-nail can hardly discern the slightest abrasion.

The wider open the valve stands the further will the steam follow, so that to produce a variable cut-off it is merely necessary to arrange for the valve to fall upon an adjustable stop, the position of which is controlled by a ball governor of any degree of sensitiveness, and, owing to the entire absence of resistance to any change of opposition, the regulation is exceedingly quick and close. As an instance of this the makers quote an engine 10 x 15 inches, that under a constant load runs at 226½ revolutions with 80 pounds boiler pressure, and at 226 revolutions with 50 pounds boiler pressure, a loss of less than ½ of 1 per cent. for a change of 30 pounds in the boiler pressure. This is remarkably close regulation and commends itself to those requiring engines for electric lighting.

The use of a distributing-valve with an independent cut-off valve that requires no mechanism for its action presents points for careful study. By means of the main valve, the lead, the exhaust and the amount of compression can be adjusted to suit the exigencies of any particular engine without con-

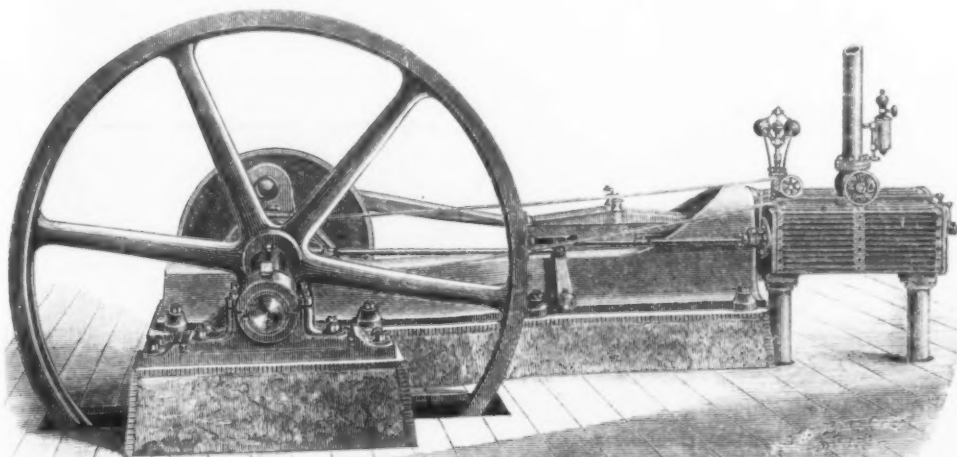


Fig. 1.—Perspective View.



Fig. 4.—Cut-Off Valve.

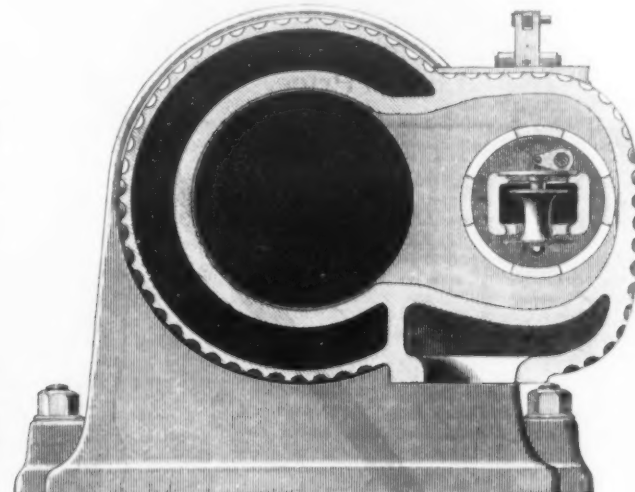


Fig. 6.—Cross-Section of Cylinder and Valve-Chest.

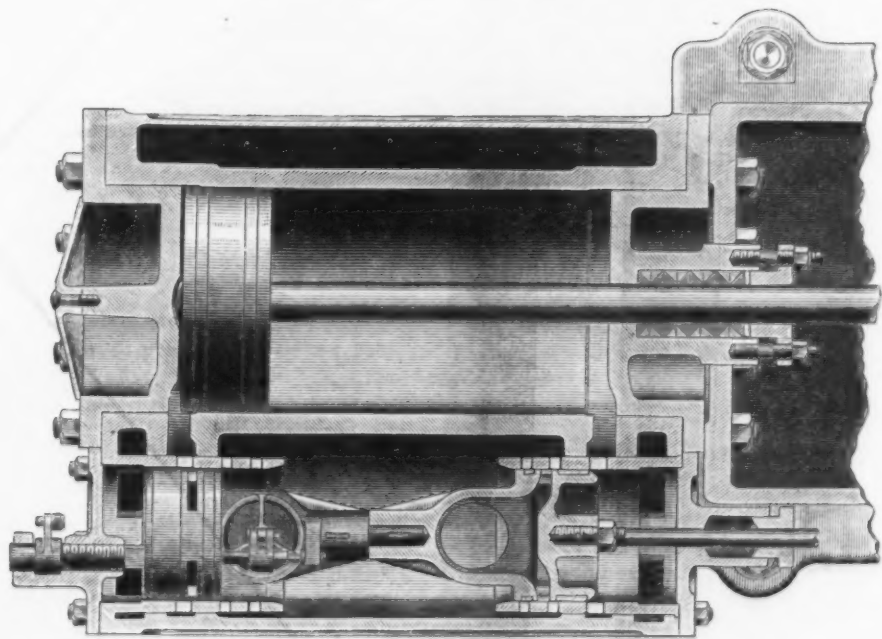


Fig. 2.—Longitudinal Section of Cylinder and Steam-Chest.

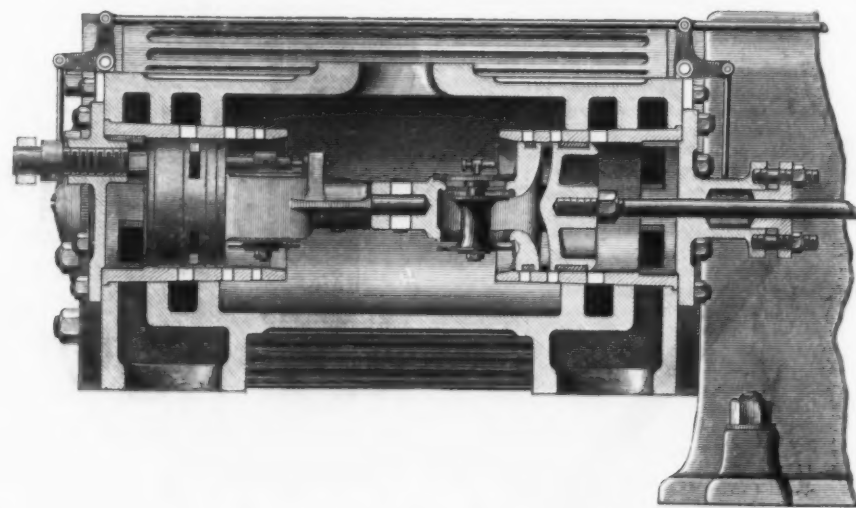


Fig. 3.—Section Through Steam-Chest and Valve.

## THE MAN AUTOMATIC ENGINE, BUILT BY THE HENDEY &amp; MEYER ENGINEERING CO., DENVER, COL.

a relative phrase, and that a contrivance justly calculated to improve an engine working under one set of circumstances may be a retrograde step under another. At present all men who seek for additions to the existing stock of knowledge of the laws governing, and the phenomena attending, the derivation of work from steam acting on a piston in a cylinder turn their eyes and their hopes to the marine engine as the most likely source from which to expect light. Nor is this to be wondered at. The modern conditions of social as well as of cosmopolitan and financial life have placed steam navigation and its accessories more before public notice than any other branch of mechanical engineering, save locomotives on railways. No other application of steam-power demands for its successful employment so many combined excellences under, perhaps we may also say, equal difficulties; but, on the other hand, it has the advantage of being placed above what we may fairly designate as the more degrading influences of competition. Large capital, independent supervision, and—defective though they certainly are in some points—Board of Trade regulations, contribute to maintain sound materials and good workmanship, while a healthy form of competition prevents the use of any but first-class machinery, to the design of which the best theoretical science and practical experience have been brought, and both of which show that, however great an advance has been made, there is yet room for further progress.

Two points peculiar to modern steam navigation render the marine engine room the leading steam school. First, the yearly more accentuated necessity for fast steamers, and for obtaining maximum powers in very limited spaces, and from every bushel of coal. Secondly, the fact that there is plenty of capital available to aid the marine searchers after excellence, and the stimulating conviction that none other than excel-

tempt to get orders at any price. In times of depression the cheap firms are usually the first to fail, having neither capital nor credit. Steam users in many cases also do much to discourage the manufacture of really good and economical machinery by the reckless ill usage they give their engines, even the plainest types speedily giving up their lives under every cruelty. Of course makers are not to blame for this so long as they impress upon their customers the necessity for taking care of a good engine when they get one. The evil still remains, however, that a remembrance of the sort of folk who will get charge of their best engines often deters makers from attempting progress or improvement.

## Locomotive Boiler Explosions.

No class of steam boilers largely used in America, says the *National Coal and Locomotive Builder*, is so free from disastrous explosions as those used in our railroad locomotives, which is something remarkable in the presence of the fact that few boilers are run with a smaller safe margin of strength. Within the last few months there have been several locomotive boiler explosions that direct our attention to the subject, and we are the more disposed to discuss it since attempts have been made to attribute one of the explosions to some mysterious cause beyond human comprehension. When a boiler explodes under a pressure which had often been carried before without signs of weakness, certain parties are sure to proclaim that some mysterious agency has been at work. In other departments of mechanical engineering similar phenomena are of daily occurrence and pass without comment. A link in the chain of a crane breaks under a lighter load than the chain lifted two hours before; a crank axle breaks, not when the engine is working at its maximum power, but under comparatively light duty; a locomotive axle breaks when the

motive boilers, and in 1885 the number reported was 11. This gratifying improvement is no doubt due to greater care and skill in designing, to better material used in construction, to more careful workmanship, and to the growing practice of rigid tests and searching inspection. This has been the line of policy advocated by the Master Mechanics' Association as the proper means for making locomotive boilers as safe as human agency can make a vessel containing the potential destructive agencies inside a high pressure boiler, and the men who enforce this policy in their daily practice are the men who secure immunity from accidents. The safety of locomotive boilers, even those that have been well made of proper material, is secured only by the constant care and unremitting vigilance that will be sufficient to guard against and detect in time deteriorating influences. When these are relaxed for any length of time disaster is inevitable.

## The Man Automatic Cut-Off Engine

We take pleasure in laying before our readers this week illustrations of a new automatic engine built in Denver, Col., by the Hendey & Meyer Engineering Co. The chief feature of interest in the engine is the valve arrangement, and to this, accordingly, special attention is directed. Of all principles hitherto applied to effect variable cut-offs, that of the "drop" is the most beautiful as an ideal cut-off, but in practice it is well known that the Corliss valve gear and its many modifications present some problems of great difficulty. The essential mechanism for producing the "drop" is the trip, which, with its connections, limits to a great degree the speed of rotation of the engines to which it is applied. Consequently this non-positive class has been superseded by the positive-motion class of valve gears for high-speed engines. All of these, however, are claimed to pre-

pockets for the reception of the cut-off valves, one for each end of the cylinder. The cut-off valve, as we have intimated, is constructed on the differential principle, for the double purpose of increasing the amount of opening and decreasing the weight of the valve. It is simply a hollow bobbin of steel with two flanges, as shown in Fig. 4, the lower one being slightly the larger, and is arranged so as to slide on a vertical spindle and close the orifices formed in the pockets of the piston-valves.

All the steam, on its way to the cylinder, must pass through the top and bottom seatings of the cut-off valve. If, then, the position of this valve be such as to impede the flow of steam, the pressure within the pocket becomes slightly reduced, the reduction of pressure increasing with the increased demand for steam as the piston advances, so that at some point in the stroke the excess of pressure acting upward becomes greater than the weight of the valve acting downward, and the valve, being unable to remain open any longer, is instantaneously closed at a speed approximately the same as the velocity of the entering steam. It will thus be seen to be an automatic cut-off of the non-positive class, actuated without mechanism of any kind, and equally applicable to any speed of engine, for the simple reason that the action of the cut-off is dependent solely upon the velocity of the entering steam. It will very naturally be inferred by some that the great velocity with which the valve closes and the metallic contact between the valve and its seating will produce a disagreeable noise and an injurious effect upon the valve itself. This, the builders inform us, is not the case. The force of a blow is proportionate to the weight and velocity of the moving body, and as the valve, owing to the principle of its construction, is exceedingly light (that for a 160-horse power engine weighing less than 2 pounds), the noise is said to be scarcely perceptible, and at the

considering the point of cut-off of the main valve. By a correct proportioning of ports and port openings the finest possible admission and steam lines can be achieved, and at the same time, by the instantaneous action of the cut-off valve, a perfect cut-off and expansion line is the result.

The bed-plate of the engine is of the well-known Porter-Allen type. The pillow-block is a special feature of the engine. The bottom half is solid with the bed, lined with best Babbitt metal, expanded and accurately bored out. The advantages of a complete half-box over those divided below the center line are in thus providing an oil trough on both sides the whole length of the journal, and in preventing oscillation of the shaft in the journal. The two top quarter-boxes, which are made extra heavy to prevent springing, are adjustable vertically by raising or lowering the cap by means of the main bolts and set-screws, and laterally by substantial wedges, four in number, placed at the extreme edges of the journals. They are raised by means of studs projecting through the cap, and can be regulated by hand, while the engine is in motion, so as to feel and adjust the amount of lost motion in the journal to a minimum, thereby insuring fine adjustments. The length of the bearing is double its diameter. The crank shaft is of best hammered iron, enlarged in the center between the journals, to prevent any bending from the weight of the fly wheel or the strain of the belt. It has also an enlarged end, on which is accurately fitted and keyed the crank disk, the latter is subsequently trued up on its hub and rim, the hub projecting toward and as near to the connecting-rod as practicable. This materially lessens the total overhang from the main bearing to the connecting-rod, and reduces to a minimum all the severe strains thrown upon the neck of the shaft and the bearing. The boring out of the disk for the crank-pin is done by special



# THE VICTOR BARN DOOR HANGER.

Has no Flanged Wheel  
to Break.

The Wheel runs  
on the Base of  
the Rail, and  
Cannot be  
Cramped.

Hangers and Rail pack  
very snug.

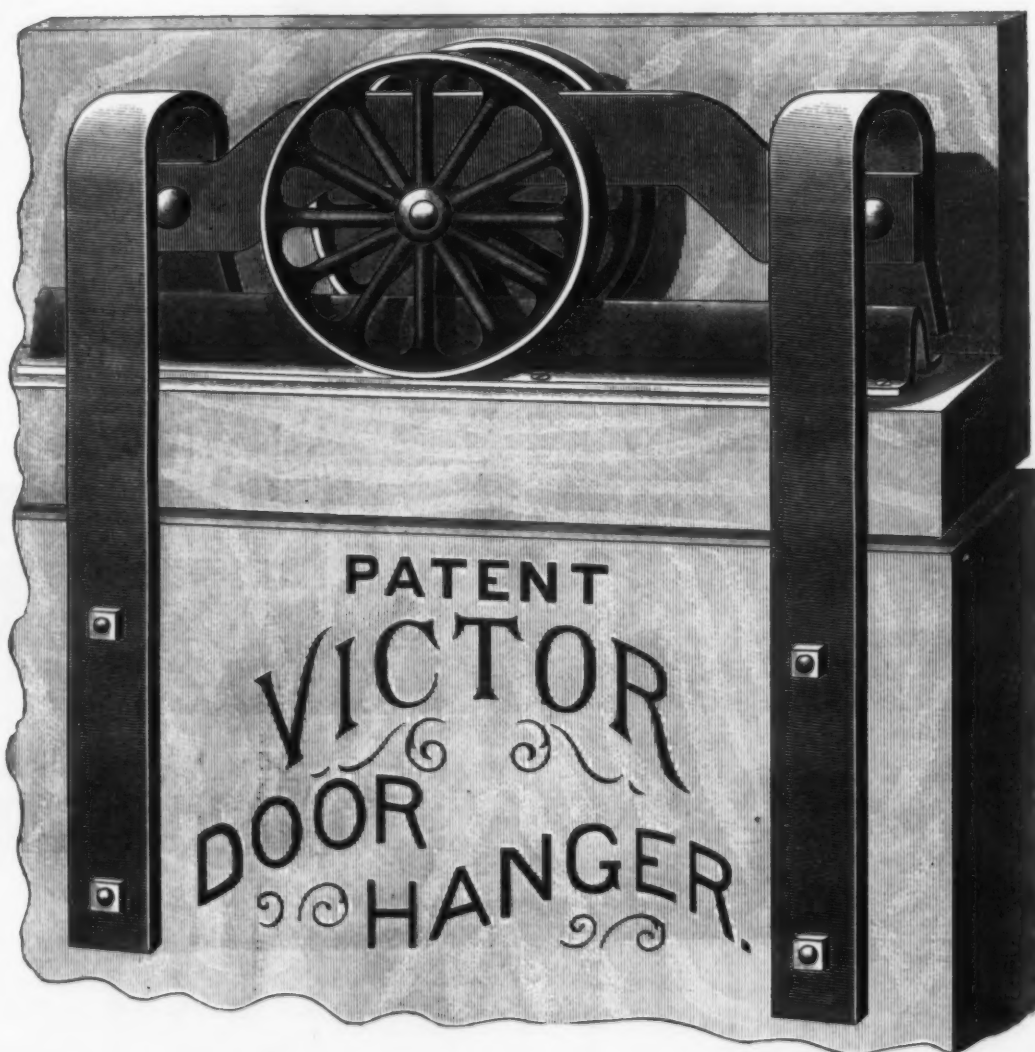
Are thoroughly made.  
Nicely Japanned.  
Low in Price.

Sizes adapted to doors  
3 to 16 feet wide,  
of any weight.

Occupies least  
possible space  
over door.

The Security Lip  
prevents derail-  
ment, clears chaff,  
ice or snow  
from the rail.

Anti-Friction.  
Requires No Oil.



The above Cut represents one-half set VICTOR Door Hangers attached for use.

**S**TRONG.  
ECURE.  
SILENT.  
SIMPLE.

Hangers and Rail  
made of Wrought  
Metal.

Printed matter and  
Models furnished  
to our Customers.

Easily Applied.  
Best Construction.  
Bound to Lead.

Try a sample lot and  
be convinced.

We solicit investiga-  
tion and correspond-  
ence from the trade.

## VICTOR MANFG. COMPANY,

NEWBURYPORT, - - MASS.



machinery that insures its alignment with the crank-shaft being an absolute certainty. Opposite to the crank-pin are recesses cast in the disk for the reception of lead, the weight of which is so proportioned as nearly to balance the weight of the reciprocating parts. The crosshead is cast iron, of the well-known type originally adopted by Charles F. Porter. It has very large bearing surfaces, in which there are a number of holes for the reception of Babbitt. The pin is of hardened steel, flattened on the top and bottom to prevent binding of the brasses. The cylinder of the overhanging type is an exceedingly simple casting. It is made with

His pipe-crimping machine in its perfected form it is shown in the accompanying engraving. A sample machine, which we have the pleasure of examining as we write, shows the article to be simple in its several parts, very effective in action, and of remarkably easy adjustment to accomplish the different results in view. The tool presents a striking departure from the plan generally followed in the past in this class of machinery. The upper rolls are secured to a lever, and each roll revolves on an axle entirely independent of the other. This feature, which we believe is entirely new, gives means of accurate adjustment

ingenuity is responsible. It recommends that "the feed water should be forced through one of the usual feed contrivances into the steam dome, in which it is mixed by a jet of steam entering concentrically, in order that it may, during the mixing, be cast violently against the cover of the dome. The effect of this movement is that all the water receives the full temperature of the surrounding steam. By this sudden heating, air and carbonic acid are withdrawn from the water, and not only the carbonate of lime but the sulphate of lime and magnesium are extracted, and the precipitate occasioned is periodically removed." Whether or no

#### Four-Cylinder Locomotives for Increased Tractive-Power.

Mr. Edward E. R. Trotman, writing in the last issue of the *National Car and Locomotive Builder*, says:

Since the early days of locomotives various devices have from time to time been brought forward to increase the tractive-power of these engines by means of additional steam cylinders, and some of the methods have been put into practical use with more or less success, but as a class they have not been found to satisfactorily perform the work required of them. The method in which this increased power is sought to be applied is by increasing the number of wheels to which the steam-power is transmitted, thereby increasing the amount of adhesion. In the more primitive days of railroads, when six-wheeled engines were the general type, this presented rather more difficulty than at the present time, but although there are now Decapod engines in use on lines with sharp curves and steep grades—the necessary play being obtained by placing "blind" or flangeless tires on some of the coupled wheels—the use of engines with duplicate sets of driving gear still obtains to some extent. Locomotives of this latter type may be divided into two classes, viz., those in which the tender-wheels are utilized for traction and those in which the engine itself is carried upon separate sets of driving-wheels. Spon's "Dictionary of Engineering" mentions the following:

"*Verpilloux*.—First introduced in 1842. The engine and tender on his system were on separate frames, and were each carried on 4-foot driving-wheels, with a wheel-base of 5 feet 6 inches. Each frame had a pair of outside cylinders. It was actually used on steep grades.

"*Czernuschi*.—This scheme, which was never put into practice, included secondary cylinders on the tender, and proposed to employ all the wheels of the train for tractive purposes by means of bevel gearing.

"*Sturrock*.—This celebrated locomotive engineer, of the Great Northern Railway (England), built engines with six coupled wheels and a six-wheeled tender, the wheels of which were coupled together and driven by secondary cylinders. The frames were separate. The engine-wheels were 5 feet and the tender-wheels 4 feet 4 inches in diameter. These engines were extensively used at one time, with satisfactory results.

"*Flachat*.—Proposed to apply steam cylinders and driving gear to the tender and cars for the Alpine Railway; the scheme was never carried out.

"*Fairlie*.—Steam tender similar to Sturrock's plan. Engine carried on six coupled wheels 4 feet in diameter, arranged in swiveling truck; and tender, separate frame, on four wheels of same size.

"*Maurice Urban*.—Grand Central Railway of Belgium. Inside cylinders. Engine and tender on separate frames, and each carried by six coupled wheels 4 feet in diameter. Secondary cylinders to tender.

"*Vuellemain*.—Eastern Railway of France. Steam cylinders and six wheels to both engine and tender.

"*The Northern Railway*.—Of France had an engine carried on two four-wheeled trucks, each with outside cylinders and mechanism."

A new method has recently been patented for this purpose, which, departing from the beaten paths of locomotive construction, presents some novel features which attract attention by reason of their boldness. The engine in question—as described in detail in the specification, though the principle is also shown as applied to various types of engine—is carried on six driving-wheels and the tender on the same, all of the same diameter; an ordinary four-wheeled truck is placed under the smoke-box and another under the foot-plate, these secondary trucks being pivoted in the usual way, but the center pin, instead of being attached to a rigid frame, is attached to the driving-wheel truck-frame, which is itself pivoted at a center bearing. Both engine and tender are carried upon one and the same rigid frame, but a marked peculiarity and divergence from previous methods is that, while the cylinders are attached to the main frame, the groups of wheels to which they impart motion are carried by a separate and swiveling frame; so that on curved portions of track the longitudinal axis of the cylinders and the truck-frames are not parallel. In order to allow for the angle between the plane of motion of the crank-pin and the longitudinal axis of the piston-rod consequent upon this arrangement, the strap ends of the forward ends of the main connecting and tension rods are pivotally connected to the brasses, so as to allow of a horizontal vibration, while at the same time the brasses may be filed or keyed up without affecting this movement of the rods. An arrangement of a similar character is applied to the eccentric-rods for the same purpose.

The piston-rod crossheads are not connected directly to the crank-pins by connecting-rods, but act through an intermediary system of levers which not only allows of the swiveling of the truck frames without interfering with the transmission of power, but also permits a "crank pin stroke greater than that of the pistons, and consequently of a reduced piston speed relatively to a given speed of the driving-wheels."

The crossheads carry pivoted to them vertical rocking levers, to the lower extremities of which are attached tension-rods, which, at their other ends, are fastened to pins on the truck-frame, so that as the points of attachment to the truck-frame move back or forward, as the truck swivels on the curves, the forward end of the main connecting-rod is moved to a corresponding extent by means of the crosshead lever. The motion is transmitted to the other driv-

ing-wheels in the truck-frame by means of the ordinary coupling-rods. The description here given of the mechanism for the truck frame under the engine applies to the other frame under the tender, the two being precisely similar; the cylinders of the latter are bolted to a casting forming the foot-plate. The boiler is of the ordinary loco-tubular type, but the fire-box, being between the two truck-frames, is not cramped by the wheels and can therefore be made as wide as the construction of the track will permit. The driving-wheels have the usual amount of vertical play in their boxes, and the weight is distributed over the axles by a system of levers connecting the pedestal of the center axle with the laminated springs placed over the axles. The truck frames carry the pistons and draw gear. This is but a brief description of the engine chosen by the inventor for the illustration of the principles of his design, modifications of which principles are also suggested and methods shown by applying the same to various classes of locomotives; but it is sufficient to give a fair idea of the salient points of the invention.

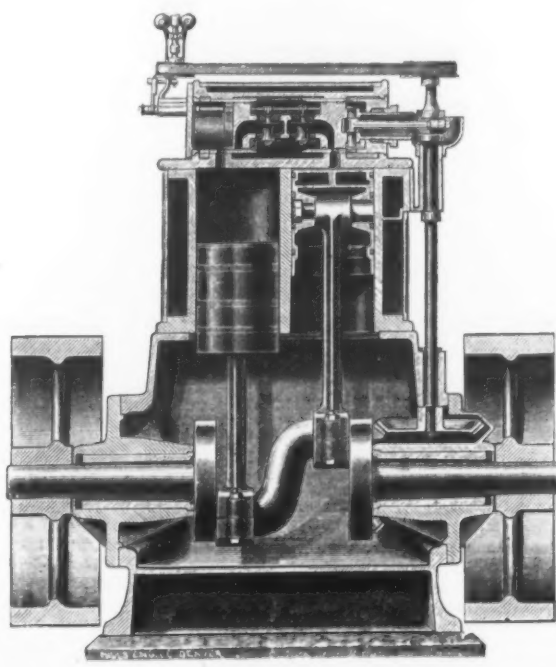
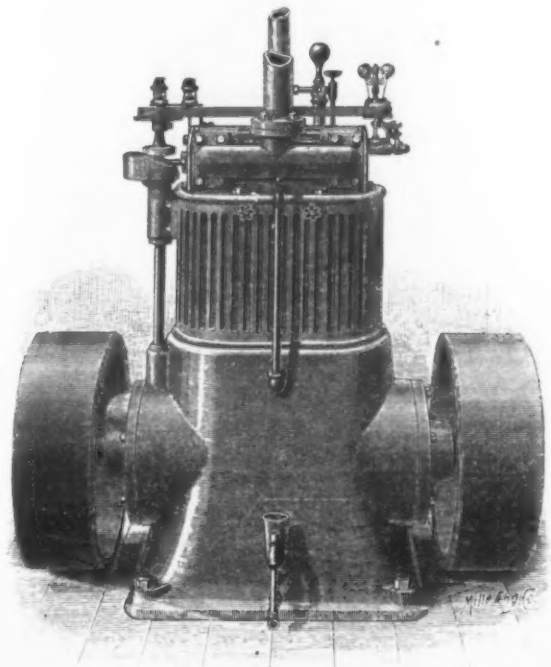
A locomotive of this construction does not belong strictly to either of the two classes referred to at the commencement of this article, for, although the second set of driving gear is under the tender, yet that tender being carried on the same frame as the engine the conditions are not to be considered the same as where it is carried upon a separate frame. There is one thing, however, which militates against the effectiveness of the duplicate gear upon tenders on separate frames, which applies to the above described engine in spite of the single rigid frame, and that is the comparatively slight weight on the tender axles, so that with a heavy train on a steep grade very little extra useful adhesive power would be developed by these wheels.

In the "double boiler, double bogie" type of engine invented and successfully introduced by the late Mr. Robert Fairlie for the purpose of hauling heavy traffic over steep and winding roads, and so well known by his name, the conditions are very different. In the Fairlie type—now used in all parts of the world—not only is an extended flexible wheel-base obtained with a minimum rigid wheel base, but each truck carries the weight of an entire boiler and appurtenances, thus giving all the driving-wheels an equal weight for adhesion. The engine has two ordinary locomotive boilers placed end to end, with a large divided fire box between them and the smoke-boxes at the outer ends. Under each boiler is a truck-frame carrying the cylinders, motion and driving wheels, the steam and exhaust pipes having flexible joints; the fire-boxes, which are fed at the side, can be of the full width between the main frames, and there is always—under proper conditions of water level in the boiler—a sufficient depth of water over the crown of the fire-box. The main difficulty experienced with these engines is said to have been the keeping tight of the steam and exhaust pipe joints, and this, I have been informed by a gentleman formerly in the locomotive department of the Cape Government Railways, was especially the case under the trying conditions of actual working on the rough lines of that system; but this is a matter of detail which should not be insurmountable, and is not a matter of principle.

In view of the loads hauled on roads with steep grades and sharp curves by engines of the ordinary construction, it does not seem likely that engines with duplicate gear will become general; but on roads where such engines are considered a necessity, it would, in the writer's opinion, be cheaper in first cost and more economical in working to adopt the Fairlie type of locomotive; with such an engine there is no complication of working gear, the two bogies having each its set of steam cylinders, valves, motion and mechanism complete, and each bogie has a weight on it sufficient to give powerful adhesion for tractive purposes. These engines, too, have had a wide and varied field of operations, with some very severe trials, and, though in some quarters there has been considerable opposition and antagonism to them, it cannot be denied, in face of their extensive adoption throughout the world, that they have proved their capability for performing the heavy work assigned them.

The new type of engine herein described has not been put into operation, and no comparisons, therefore, as to its working can as yet be drawn between it and the widely-used Fairlie type; and though it may, of course, prove satisfactory, it seems to the writer that the connection between the rigidly-fixed cylinder and the driving-wheels carried by a movable truck frame will prove a greater defect than the flexible pipe joint, and is, moreover, a matter of the principle of design of the engine, while the transmission of power through the levers seems likely to involve the absorption of a large proportion of the power. Further, while the mechanism for shifting the stub end of the connecting rod in accordance with the movement of the crank-pin may act well on a line with strictly accurate and well-laid curves and tangents, it seems probable that the swiveling motion caused by the irregularities of road bed and track, which would probably be numerous on such lines as this engine is intended for, would cause a considerable amount of wear and tear, and what is more important still, an irregular working of the gear, causing several strains upon the crank-pin and the entire mechanism. As said before, however, there is as yet no working experience, and when an engine on this system is put on the track its performance will doubtless be noted with interest by engineers and locomotive men.

The negotiations between the French and Italian Governments for a renewal of the treaty of navigation are at a standstill. As the Italians admit France to their entire coasting trade, they demand a share in the carrying trade of France in the Atlantic and Channel ports, but France, rather than admit English shipping to carry cargo along the Atlantic Coast under favored nation clauses, would renounce the treaty with Italy.



The Man Automatic Engine.—Figs. 6 and 7.—Single-Acting Trunk-Piston Engine Fitted with the Man Valve.

or without a steam jacket, the lagging being cast on and the space between it and the cylinder proper filled with asbestos, but in large engines the lagging is loose and made of iron or wood, as preferred. The total length is in excess of that of most cylinders, so as to obtain straight ports and a minimum clearance and to give ample room for the travel of the piston-valves. The connecting-rod possesses several features of merit. The straps are made loose at both ends and are secured by means of taper steel bolts having a nut at each end, so that at any time the bolts can be driven home and bolted up, making the ends as good as if solid. A sight feed lubricator is supplied with every engine for attachment to the steam pipe. The moving parts are also supplied with oil from sight lubricators.

Figs. 6 and 7 represent general and sectional views respectively of a single-acting trunk-piston engine fitted with the Man valve. The section is self-explanatory. We may add that Mr. Man's valve is applicable to every class of engine.

#### The Jones Car-Wheel and Axle.

Messrs. Aikin & Lighton, of Birmingham, Ala., are now putting on the market a car-wheel and axle specially designed for use in ore and coal mines. The engravings which we annex show the arrangement adopted so clearly that little explanation is necessary. The axle is square in section, and carries a bushing which, when worn out, can be easily replaced with a new one at a low cost and without removing the wheel from the axle. The hub of the wheel is chilled and the wear accordingly comes chiefly on the bushing. The axle practically never wears out, and the saving effected thus becomes appreciable. Lubrication is secured by means of an oil cup which is cast on the bushing and de-

not attained in other devices. These improvements, in combination with other features, give the machine a capacity for rapid work, while at the same time exact uniformity, so necessary in all cases, is maintained. By examination of the cut it will be seen that the swedge is separated from the upper crimping roll. It may be used with it or not, according to the nature of the work obtained. The only thing neces-



The Lightning Pipe Crimper, Made by the Indianapolis Elbow Co., Indianapolis.

sary to accomplish this is loosening a thumb-screw placed on top of the swedge. The swedge is readily returned to the exact position previously occupied whenever its presence is so desired. These special advantages are secured in this machine without any sacrifice of the ordinary qualities secured in such tools. The rolls are brought together by a foot treadle, as indicated in the engraving, and are held apart by a

this plan has ever been tried we are not informed. Whatever its effect would be as a means of preventing the formation of troublesome deposit, there can be no question as to its influence as a method of feeding simply. The dome of a boiler is certainly not the proper place into which to direct the water supply, and a test of the method would speedily furnish proof of the desirability of abandoning it. The item is worthy of attention specially because of its tendency to belittle the importance of properly locating the feed-pipe and to encourage the sacrifice of good practice in that respect for something which can be obtained to a reasonably satisfactory extent by already well-known methods.

#### Improved Steam Glue Heater.

Pattern-makers, joiners and all who have occasion to use glue will be interested in the new steam glue heater shown in the annexed cut, and made by Hancock & Maule, of 243 South Third street, Philadelphia, Pa. It is made of cast iron throughout, and is provided with a hollow base in which the steam circulates, by which arrangement all joints are dispensed with and leakage rendered impossible. The pots are enameled inside, which prevents any discoloration of



Improved Steam Glue Heater.

the material being prepared from contact with the iron. All heaters are tested under 100 pounds pressure. They are made in 15 different sizes.

Mr. Oberlin Smith, of the Ferracute Machine Co., of Bridgeton, N. J., has just secured a patent for an invention relating to tools for drill presses. Its design is to furnish in a convenient and efficient form a double tool the parts of which may be successively used in the formation and counter-boring or threading of holes. To this end the invention consists principally in an improved device for use in drill presses, composed of a forked stock that is adapted to be secured within and revolve with a drill spindle, and a tool which is pivoted centrally within or between the forks of this stock, and at each end is adapted for use in operating in connection with a hole, in combination with means by which the tool may be locked in line axially with the stock. It consists, further, as a means for counter-boring the inner end of a hole in a bar which is adapted to loosely fill and be revolved within the hole, and a cutter that is pivoted within the lower end of the bar, and is adapted by pressure against the end of the hole to be forced radially outward.

Mr. Nathan F. Burnham, of York, Pa., has secured a patent relating to automatic engines. Its objects are to provide a cheap, simple, durable and effective automatic cut-off engine capable of running at a predetermined high rate of speed, to maintain that speed by means of a self-regulating governor, to provide a continuous, effective and automatic lubrication and to prevent the escape and waste of the lubricating materials.



Fig. 1.—Side Elevation.

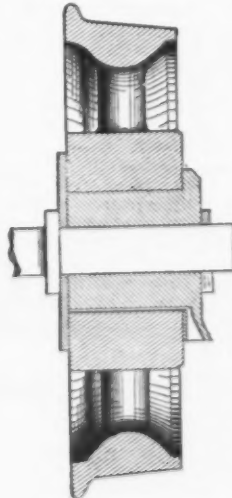


Fig. 2.—Section.

#### CAR WHEEL AND AXLE FOR COAL AND ORE MINES, MADE BY AIKIN & LIGHTON, BIRMINGHAM, ALA.

livers its supply to a longitudinal groove in the latter. Messrs. Aikin & Lighton intend to manufacture the wheels and axle on a large scale, and are building one of their improved sand-molding machines for that purpose. The machine will have a capacity of 100 wheels and bushings per day. The manufacturers write us that, "if the merits of the wheel and axle are to be judged by the orders received, it is designated to be the future wheel for ore and coal mines."

#### A New Pipe Crimper.

Mr. W. A. Wheeler, of the Indianapolis Elbow Co., of Indianapolis, Ind., is already favorably known in connection with a number of desirable specialties in sheet metal and in sheet-metal working appliances.

spring, as shown. The crank is attached to the lower axle, and, as already mentioned, the construction of the machine is simplicity in itself.

#### Preventing Boiler Scale.

Boiler incrustation has been a subject of much discussion, and the list of methods thus far proposed to offer relief from its annoying and dangerous presence is of considerable length. With but few exceptions, however, their chief claim to attention is to be found in their novelty alone, and the results of their practical application would often prove more surprising than agreeable. This is particularly true of a method to which of late a good deal of currency has been given, and for which, it seems, German



# MANHATTAN BUILDERS' AND READING, STANDARD HARDWARE GOODS

Change to net bottom prices of all goods manufactured by us. Prices good until May 1st. Terms, cash in 15 days. No discount for spot cash. No deviation from these prices for quantities less than \$1000. None but dealers in Hardware and kindred goods can buy from us. We sell no others. Prices as given here are the same to domestic and foreign purchasers. All goods warranted first-class in every respect, and as good at least as those made by the oldest and best makers in the universe. Orders can be sent with perfect confidence that our goods are standard, finely finished, and made to suit the best trade. All goods delivered F. O. B. here. No charge for casing or cartage. Freight, same rates as from Philadelphia.

## LOCKS.

### Upright Rim Knob Locks, without Knobs.

No.	Per doz.
308, 4-inch, 2 Polished Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	\$0.90
309, 4-inch, 2 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes.....	1.24
310, 4-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes.....	1.49
310½, 4¼-inch, 2 Copper Bronze Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, with stop.....	.90
311, 4¼-inch, 2 Polished Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, with stop.....	.97
312, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, with stop.....	1.29
313, 4¼-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, with stop.....	1.54
314, 4¼-inch, 2 Polished Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	1.02
315, 4¼-inch, 2 Polished Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, Patent Reversible Bolt, with stop.....	1.07
316, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, with Patent Reversible Bolt and stop.....	1.34
317, 4¼-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, with Patent Reversible Bolt and stop.....	1.59
318, 4¼-inch, 3 Polished Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, with stop and Patent Reversible Latch.....	1.32
319, 4¼-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, with stop, Patent Reversible Latch.....	1.54
320, 4¼-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, with stop and Patent Reversible Latch.....	1.90
321, 4¼-inch, 3 Polished Iron Bolts, tinned flat Iron Key, 1 tumbler, 12 changes, with Patent Reversible Latch.....	1.49
322, 4¼-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, with Patent Reversible Latch.....	1.74
323, 4¼-inch, 3 Polished Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	2.20
324, 4¼-inch, 2 Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	1.02
417, 4¼-inch, 2 Iron Bolts, tinned Malleable Iron Key, 1 tumbler, 12 changes, Patent Reversible Latch, with stop.....	1.42
418, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch, with stop.....	1.09
419, 4¼-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch, with stop.....	2.21
420, 5-inch, 2 Polished Iron Bolts, tinned Malleable Iron Key, 1 tumbler, 12 changes, with Patent Reversible Latch and stop.....	1.02
421, 5-inch, 2 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop.....	2.42
422, 5-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop.....	2.67
423, 5-inch, 3 Polished Iron Bolts, tinned flat Iron Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop.....	2.52
424, 5-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop.....	3.02

425, 5-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop.....	3.87
414, 6-inch, 2 Iron Bolts, Tinned Iron Key, 1 Tumbler, 12 changes, Patent Reversible Latch.....	2.97
415, 6-inch, 2 Polished Iron Bolts, Brass Key, 1 Tumbler, 12 changes, Patent Reversible Latch.....	3.47
416, 6-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	4.24
420, 6-inch, 3 Polished Iron Bolts, tinned flat Iron Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	3.54
401, 6-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	4.04
403, 6-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	4.92

### Horizontal Rim Knob Locks.

325, 4¼-inch, 2 Polished Iron Bolts, tinned Malleable Iron Key, 1 tumbler, 12 changes, with stop.....	\$1.07
326, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 12 changes, 1 tumbler, with stop.....	1.39
327, 4¼-inch, 2 Polished Brass Bolts, Brass Key, 12 changes, 1 tumbler, with stop.....	1.74
328, 4¼-inch, 2 Polished Iron Bolts, tinned Iron Key, 12 changes, 1 tumbler.....	1.02
329½, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 12 changes, 1 tumbler.....	1.27
329, 4¼-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes.....	1.67
330, 4¼-inch, 2 Polished Iron Bolts, tinned Malleable Iron Key, 12 changes, 1 tumbler, with Patent Reversible Latch and stop.....	1.16
331, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop.....	1.47
332, 4¼-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop.....	1.77
340, 4¼-inch, 3 Polished Iron Bolts, tinned Malleable Iron Key, 12 changes, 1 tumbler, Patent.....	1.58
341, 4¼-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	1.92
342, 4¼-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	2.67
343, 5-inch, 3 Polished Iron Bolts, tinned Malleable Iron Key, 12 changes, 1 tumbler, Patent Reversible Latch.....	2.46
344, 5-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	2.96
345, 5-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	3.87
346, 6-inch, 3 Polished Iron Bolts, tinned Malleable Iron Key, 12 changes, 1 tumbler, Patent Reversible Latch.....	3.23
347, 6-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	3.77
348, 6-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch.....	4.66

### Mortise Knob Locks.

450, 3½-inch, 2 Polished Iron Bolts, tinned flat Malleable Iron Key, polished and lacquered Iron front and strike, Japanned Cases and Escutcheons, 1 tumbler, 12 changes, Patent Reversible Latch.....	\$1.37
451, 3½-inch, Iron front and strike, tinned Malleable Iron Key, 2 Brass Bolts, Brass Key; same finish as No. 450.....	2.02
452, 3½-inch, 2 Polished Iron Bolts, Brass Key; same finish as No. 450.....	1.62
453, 3½-inch, 2 Brass Bolts, Brass Key, Brass front and strike; same finish as No. 450.....	2.87
454, 4-inch, 2 Polished Iron Bolts, polished and lacquered front and strike, tinned flat small Iron Key, Japanned Case and Escutcheons, 1 tumbler, 12 changes, Patent Reversible Latch.....	1.87
455, 4-inch, do., do., do., Brass Key.....	2.12
456, 4-inch, do., do., do., Brass Bolts and Key.....	2.97

457, 4-inch, Brass front and strike, Brass Key; same finish as No. 454.....	3.26
460, 3½-inch, Olympian Bronzed Ornamental Iron front and strike, tinned flat small Iron Key, 12 changes, 1 tumbler, Patent Reversible Latch.....	1.97
463, 3½-inch, do., do., do., Brass Key.....	2.12
470, 3½-inch, do., do., do., Brass Bolts and Key.....	3.11
475, 4½ x 3½, Brass front and strike, nickel-plated Key, 2 Brass Bolts, 2 tumblers, 24 changes.....	4.87
476, do., do., Brass Key, nickel-plated.....	5.17
480, 5 x 4, Brass front and strike, Ornamental, nickel-plated flat Brass Key, 24 changes, 2 Brass Bolts.....	6.34

### Knob Latches, &c.

216, 2½ x 3¼, Horizontal Rim Knob Latch, 1 Polished Iron Bolt, Iron Hub.....	\$0.50
217, 2½ x 3¼, Horizontal Rim Knob Latch, 2 Brass Bolts, Iron Hub.....	.92
218, 2½ x 3¼, Horizontal Rim Knob Latch, 2 Polished Iron Bolts, Iron Hub, Iron Slide Bolt.....	.71
219, 2½ x 3¼, Horizontal Rim Knob Latch, 2 Polished Iron Bolts, Brass Thumb-piece.....	.82
225, 2 x 3½, Horizontal Rim Knob Latch, 2 Polished Iron Bolts, flush Thumb-piece, Patent Reversible Bolt.....	.68
227, 2 x 3½, Horizontal Rim Knob Latch, 2 Brass Bolts, Patent Reversible Latch.....	1.15
67, Thumb Latch, Wrought Iron Latch, Japanned, weight 6 pounds per doz.....	.21
6, Pittsburgh Latch, Weight 6 pounds, per doz.....	.20

We are now making as fine Locks as any manufacturer in the United States. With our new and extensive works in full operation we will be able to turn out nearly 1000 doz. per day, and selling as we do from 25 to 50 per cent. less than others, and by our present improved method of doing business making a fair, living profit, which is satisfactory to us. The trade throughout the country appreciates our method by extending to us a very large trade, which we will do our best to hold, and by fair, legitimate means increase. We warrant our Locks to be equal to those of any manufacturer, inside or outside the combination, and, although we sell them lower, we do not, on that account, make them anything but *first class*, finely finished and well japanned. We are adding new patterns continually, and in a short time the trade can depend on a full line of goods that are saleable and *first class* in every respect.

### Broughton's Patent Burglar-Proof Sash Locks.

Patented Oct. 8th, 1879.  
The Broughton Burglar-Proof Sash Locks are perhaps the best known article to-day in America. The patent was granted to John Broughton, who died in 1879, and who during his lifetime had created more articles of great merit than any man in America. The Broughton Oiler invented by him is known the world over, and when the patent, which we own, on his *Burglar Proof Sash Locks* expires we are satisfied that they will take the place of all others, for the reason that they are the simplest, cheapest and best article of the kind ever made in any country, and until we had erected our new works could not supply the demand. It has now been on the market for over six years, and the demand is more than doubling every year. While we control these goods by patent, we sell them as low as if everybody had the right to make them. Our principle of business is: No matter how meritorious an article may be, no matter how much better it may be than those made by others, to sell at a fair margin of profit, sell largely, and give the public as much benefit as we expect ourselves. We could fill the columns of *The Iron Age* with testimonials from this and other countries as proof of the intrinsic merits of the "Broughton Burglar Proof Sash Locks." We could refer to some of the leading trade in this country who would admit that at first they only bought a few dozen, but to-day are ordering in 1000-dozen lots and even more; but a good article of Real Merit like this always takes care of itself, as it were, and we would simply state to the trade that

the standard will be kept up by us, and improved if possible. These Sash Locks can be had at most all leading Hardware stores in the United States and Canada.

No.	Per doz.
1, Iron, Etruscan Bronze, Plain Lever, fine finish and extra heavy.....	\$0.34
2, Iron, Etruscan Bronze, Porcelain Knob, fine finish.....	.28
6, Ornamental Iron, Etruscan Bronze, Plain Lever, fine finish.....	.30
7, Ornamental Iron, Etruscan Bronze, Porcelain Knob, fine finish.....	.36
10, Iron, Etruscan Bronze, Plain Lever, fine finish.....	.24
15, Iron, Etruscan Bronze, Porcelain Knob, fine finish.....	.30
20, Ornamental Iron, Etruscan Bronze, Plain Lever, fine finish.....	.32
25, Ornamental Iron, Etruscan Bronze, Porcelain Knob, fine finish.....	.36
30, Ornamental Iron, Olympian Bronze, Plain Lever, fine finish.....	.44
35, Ornamental Iron, Olympian Bronze, Porcelain Knob, fine finish.....	.50
40, Ornamental Iron, Olympian Bronze, Real Bronze Knob, fine finish.....	.62
41, Ornamental Iron, Olympian Bronze, Plain Lever, Extra Heavy, fine finish.....	.52
42, Ornamental Iron, Olympian Bronze, Porcelain Knob, Extra Heavy, fine finish.....	.58
43, Ornamental Iron, Olympian Bronze, Real Bronze Knob, Extra Heavy, fine finish.....	.61
45, Ornamental Iron, Nickel-Plated, Plain Lever, fine finish.....	1.24
50, Ornamental Iron, Nickel-Plated, Porcelain Knob, fine finish.....	1.36
51, Ornamental Iron, Nickel-Plated, Brass Knob, fine finish.....	1.72
52, Ornamental Iron, Nickel-Plated, Porcelain Knob, old gold inlaid.....	2.08
53, Ornamental Iron, Nickel Plated, Real Bronze Knob, old Gold inlaid.....	2.27
54, Ornamental Iron, Nickel Plated, 2 Real Bronze Knobs, old Gold inlaid.....	2.72
73, Ornamental Iron, Real Bronze Metal Knob, very heavy, old Gold inlaid.....	1.62
80, Ornamental Iron, Olympian Bronze, Real Bronze Knobs, very heavy.....	1.71
85, Ornamental Iron, Olympian Bronze, Real Bronze Knobs, very heavy.....	1.92
90, Ornamental Iron, Olympian Bronze, Porcelain Knob, very heavy.....	1.28
95, Ornamental Iron, Olympian Bronze, Real Bronze Metal Knob, very heavy.....	1.73
100, Ornamental Iron, Olympian Bronze, 2 Real Bronze Metal Knobs, very heavy.....	2.35
51, Ornamental Iron, Olympian, Nickel Plated, Porcelain Knob, very heavy.....	2.18
72, Ornamental Iron, Olympian, Nickel Plated, Brass Knob, very heavy.....	2.71
73, Ornamental Iron, Olympian, Nickel Plated, 2 Brass Knobs, very heavy.....	3.18
210, Ornamental Iron, Etruscan Bronze, Iron Knob, very heavy.....	.60
211, Ornamental Iron, Olympian Bronze, Iron Knob, very heavy.....	.75
212, Ornamental Iron, Pompeii Bronze, Iron Knob, very heavy.....	.85
213, Ornamental Iron, Nickel Plated, Nickel Plated Knob, very heavy.....	1.25
214, Ornamental Iron, Nickel Plated, Rich old Gold inlaid, very heavy.....	1.50
215, Ornamental Iron, Nickel Plated, Pale old Gold inlaid, very heavy.....	1.60
216, Ornamental Iron, Nickel Plated, Fire old Gold inlaid, very heavy.....	1.75
217, Ornamental Iron, Nickel Plated, Crimson old Gold inlaid, very heavy.....	1.85
218, Ornamental Iron, Nickel Plated, Blue old Gold inlaid, very heavy.....	1.90
219, Ornamental Iron, Green old Gold inlaid, very heavy.....	1.50
220, Ornamental Iron, Nickel Plated, Copper Color old Gold inlaid, very heavy.....	2.00
221, Ornamental Iron, Nickel Plated, Lemon old Gold inlaid, very heavy.....	2.05
341, Ornamental Iron, Etruscan Bronze, very heavy, plain Knob and Lever.....	.72
305, Ornamental Iron, Olympian Bronze, very heavy, plain Knob and Lever.....	.85

310, Ornamental Iron, Pompeii Bronze, very heavy, plain Knob and Lever.....	.90
325, Ornamental Iron, Nickel Plated, very heavy, plain Knob and Lever.....	2.12
330, Ornamental Iron, Nickel Plated, Electro Bronze, plain Knob and Lever.....	1.16
350, Ornamental Iron, Nickel Plated, Electro Bronze.....	.30
355, Ornamental Iron, Nickel Plated, Electro Bronze.....	1.08
360, Ornamental Iron, Nickel Plated, Electro Bronze.....	1.24
365, Ornamental Iron, Nickel Plated, Electro Bronze.....	2.18
370, Ornamental Iron, Nickel Plated, Electro Bronze.....	2.62
375, Ornamental Iron, Nickel Plated, Electro Bronze.....	2.48
380, Ornamental Iron, Nickel Plated, old Gold inlaid.....	2.97

### Real Bronze and Brass.

No.	Per doz.
55, Plain Finish, Cast Brass, Fine Polish, Plain Lever.....	\$1.37
65, Plain Finish, Cast Brass, Fine Polish, Porcelain Knob.....	1.45
67, Plain Finish, Cast Brass, Fine Polish, Real Bronze Knob.....	1.72
70, Plain Finish, Cast Brass, Fine Polish, Brass Knob.....	1.63
155, Ornamental Real Bronze, Plain Flat Lever, extra Polish and Lacquered, with Real Bronze Screws.....	1.47
165, Ornamental Real Bronze Metal, Bronze Metal Knob, extra heavy, Fine Polish and Finish, with Real Bronze Screws.....	1.62
175, Ornamental Real Bronze, two Real Bronze Metal Knobs, with Real Bronze Screws, fine finish.....	1.87
185, Ornamental Real Bronze, two Bronze Metal Knobs, Bronze Metal Screws, very heavy.....	2.10
190, Ornamental Real Bronze Metal, two Real Bronze Metal Knobs, very heavy, Real Bronze Screws.....	2.24
252, Ornamental Cast Brass, Brass Knob, very fine finish, with Brass Screws, very heavy.....	2.18
253, Ornamental Cast Brass, Brass Knob, Nickel Plated, with Nickel-Plated Screws.....	2.62
254, Ornamental Cast Brass, two Brass Knobs, Nickel-Plated, with Nickel-Plated Screws.....	2.84
225, Ornamental Real Bronze and Silver-Plated, elegant finish—fit for the gods—each.....	3.00
226, Ornamental Real Bronze, two Bronze Metal Knobs, Gold-Plated, with Gold-Plated Screws—fit for a palace—each.....	5.00
315, Ornamental Polished Wrought Brass, hand made, two Brass Knobs, with Brass Screws, each.....	1.00
330, Ornamental Real Bronze, hammered by hand, two Real Bronze Knobs, very elegant, each.....	1.50
345, Ornamental Real Bronze, Japanese finish, splendid and unique shade, polished and lacquered in a new style of art, known only to us, with Real Bronze Knobs and screws, each.....	1.75
390, Ornamental Real Bronze, after the style of the old Chinese pattern as found in the ruins of Pompeii, made only by us, who own the original pattern, with the finest art finish, embossed, each.....	3.50
All Sash Locks from No. 20 to No. 390 packed with Screws, according to style of finish.	

### Brackets.

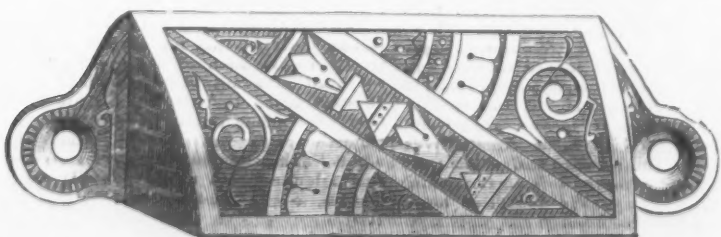
No.	Per doz. pairs.
31, 4 x 5, Ornamental Store Shelf, Japanned.....	\$0.40
35, 5 x 6, Ornamental Store Shelf, Japanned.....	.61
37, 6 x 8, Ornamental Store Shelf, Japanned.....	.84
38, 7 x 9, Ornamental Store Shelf, Japanned.....	.96
39, 8 x 10, Ornamental Store Shelf, Japanned.....	1.12

## SPECIAL NOTICE TO THE TRADE:

WE again place our *net rock bottom prices* before the trade, and trust that it will enable them to make up their orders for the spring trade with the knowledge that these prices are the lowest net rock bottom figures that can be made by any manufacturers in this country.

After three years of trial we find that this is the only honest way to do business between man and man. It is a well-known fact that before we inaugurated this system of doing business no trader could tell when he was getting bottom prices on staple articles, and after mature deliberation we decided to give the trade the full benefit of our experience by quoting net-prices from time to time of the leading articles of Hardware, from which there is no deviation under any circumstances for quantities less than one thousand dollars.

This straightforward and manly way of doing business has made us friends among the trade throughout the world, and brings us orders from all parts of the globe. It enables us to keep our hands employed at all times; it enables us to do what is right and just by our customers, for all goods made by us belong to the *first class*, are well finished in the latest style of the art, and give such universal satisfaction to the trade that it has increased our trade to such an extent that our new works are perhaps the largest and best equipped in this country. Quick sales and small profits have done this. The men of modern times are not satisfied with the old-fashioned, old-fogy way of doing business; they must have business done quickly, and desire to know at a glance what an article of every-day use, like a lock of any description, as well as a pound of nails, will cost. We have enabled them to do this, and while some dealers may not buy from us—and we do not, of course, at present, expect to supply all the trade—at least, by looking over our list, they can keep thoroughly posted on the rock bottom prices of standard Hardware goods, and save thousands of dollars in the course of a year's purchases.





# HARDWARE CO., MANUFACTURERS OF GENERAL HARDWARE.

PA., U. S. A.

AT NET BOTTOM PRICES.

April 1, 1886.

40, 8 x 12, Ornamental Store Shelf, Japanned.....	1.32
45, 4 x 5, Ornamental Store Shelf, Etruscan Bronze, with Screws.....	.60
50, 5 x 6, Ornamental Store Shelf, Etruscan Bronze, with Screws.....	.93
55, 6 x 8, Ornamental Store Shelf, Etruscan Bronze, with Screws.....	1.12
57, 7 x 9, Ornamental Store Shelf, Etruscan Bronze, with Screws.....	1.21
60, 8 x 10, Ornamental Store Shelf, Etruscan Bronze, with Screws.....	1.62
65, 8 x 12, Ornamental Store Shelf, Etruscan Bronze, with Screws.....	1.98

Ornamental Library Brackets.	
No.	Price.
70, 4 x 5, Etruscan Bronze, with Screws.....	\$0.84
75, 5 x 6, Etruscan Bronze, with Screws.....	1.03
77, 5 x 7, Etruscan Bronze, with Screws.....	1.21
80, 6 x 8, Etruscan Bronze, with Screws.....	1.32
82, 7 x 9, Etruscan Bronze, with Screws.....	1.64
85, 8 x 10, Etruscan Bronze, with Screws.....	2.08
90, 8 x 12, Etruscan Bronze, with Screws.....	2.62
95, 10 x 12, Etruscan Bronze, with Screws.....	2.92

Ornamental Cabinet Brackets.	
No.	Price.
100, 4 x 5, Pompeii Bronze, with Screws.....	\$0.96
105, 5 x 6, Pompeii Bronze, with Screws.....	1.24
107, 5 x 7, Pompeii Bronze, with Screws.....	1.48
110, 6 x 8, Pompeii Bronze, with Screws.....	1.64
112, 7 x 9, Pompeii Bronze, with Screws.....	1.96
115, 8 x 10, Pompeii Bronze, with Screws.....	2.47
120, 8 x 12, Pompeii Bronze, with Screws.....	2.96
125, 10 x 12, Pompeii Bronze, with Screws.....	3.24

Fancy Ornamental Drawer Pulls.	
No.	Per gross.
20, 3/4-inch Copper Bronzed, with Screws.....	\$0.84
22, 3/4-inch Etruscan Bronze, with Screws.....	1.21
24, 3/4-inch Olympian Bronze, with Screws.....	1.42
25, 3/4-inch Pompeii Bronze, with Screws.....	1.56
35, 4-inch Copper Bronze, with Screws.....	.96
37, 4-inch Etruscan Bronze, with Screws.....	1.48
39, 4-inch Olympian Bronze, with Screws.....	1.72
40, 4-inch Pompeii Bronze, with Screws.....	1.72
50, 4 1/2-inch Copper Bronze, with Screws.....	1.39
52, 4 1/2-inch Etruscan Bronze, with Screws.....	1.62
54, 4 1/2-inch Olympian Bronze, with Screws.....	1.84
55, 4 1/2-inch Pompeii Bronze, with Screws.....	2.16
27, 3 1/2-inch Etruscan Bronze, with Screws.....	1.24
29, 3 1/2-inch Olympian Bronze, with Screws.....	1.36
30, 3 1/2-inch Pompeii Bronze, with Screws.....	1.48
42, 4-inch Etruscan Bronze, with Screws.....	1.48
44, 4-inch Olympian Bronze, with Screws.....	1.72
45, 4-inch Pompeii Bronze, with Screws.....	1.72
57, 4 1/2-inch Etruscan Bronze, with Screws.....	1.62
58, 4 1/2-inch Olympian Bronze, with Screws.....	1.84
60, 4 1/2-inch Pompeii Bronze, with Screws.....	2.16

Real Bronze Ornamental Drawer Pulls.	
No.	Per doz.
224, 3/4-inch Genuine Bronze Metal, with Real Bronze Screws.....	\$1.08
229, 4-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.86
254, 4 1/2-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.72
229, 3 1/2-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.08
244, 4-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.86
250, 4 1/2-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.72
234, 3 1/2-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.08
240, 4-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.86
254, 4 1/2-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.72

Window Pulleys.	
No.	Per doz.
1, 1 1/4-inch, in Bulk, Plain Front and Wheel.....	\$0.12
2, 2-inch, in Bulk, Plain Front and Wheel.....	.15
3, 2 1/4-inch, in Bulk, Plain Front and Wheel.....	.19
4, 3 1/4-inch, in Bulk, Plain Front and Wheel.....	.23

Window Pulleys.	
Extra heavy, best quality.	
No.	Price, per doz.
1 1/4-inch, in Bulk, polished wheel, plain front.....	\$0.14
2-inch, in Bulk, polished wheel, plain front.....	.18
2 1/4-inch, in Bulk, polished wheel, plain front.....	.21
2 1/2-inch, in Bulk, polished wheel, plain front.....	.25
2 3/4-inch, in Bulk, polished wheel, plain front.....	.29
2 1/2-inch, in paper, polished wheel, plain front.....	.19
2 3/4-inch, in paper, polished wheel, plain front.....	.22
2 1/2-inch, in paper, polished wheel, plain front.....	.26
2 3/4-inch, in paper, polished wheel, plain front.....	.30
2-inch, in paper, polished wheel, bronzed front and wheel.....	.17
2 1/4-inch, in paper, polished wheel, bronzed front and wheel.....	.21
2 3/4-inch, in paper, polished wheel, bronzed front and wheel.....	.24
2 1/2-inch, in paper, polished wheel, bronzed front and wheel.....	.28

We warrant our pulleys to be as good as the very best made by any manufacturer in the country, all riveted, with headed wrought iron rivets, wide wheel, wheel polished and wide case.

## Hat and Coat, Harness, Fancy and Plain Hooks.

No.	Per gross.
75, Japanned, perfect screw holes, always true. Weight 15 pounds per gross.....	\$0.53
210, Japanned Bull frog pattern, standard goods, 20 pounds per gross.....	.66
215, Copper Bull frog Pattern, standard goods, 20 pounds per gross.....	.66
110, Japanned Schoolhouse Hooks, extra Heavy.....	1.07
260, Ornamental Coat and Hat Hooks, Brd.. fine pattern.....	1.79
265, Ornamental Coat and Hat Hooks, Olympian Bronze pattern.....	1.90
266, Ornamental Coat and Hat Hooks, Pompeii Bronze pattern.....	2.08
275, Ornamental Coat and Hat Hooks, with wrought Screw, very fine.....	2.08
276, Ornamental Coat and Hat Hooks, with wrought Screw, Etruscan Bronze.....	2.16
277, Ornamental Coat and Hat Hooks, with wrought Screw, Olympian Bronze.....	2.40
278, Ornamental Coat and Hat Hooks, with wrought Screw, Pompeii Bronze.....	2.62
279, Ornamental Coat and Hat Hooks, with wrought Screw, Nickel-plated.....	3.67
280, Ornamental Coat and Hat Hooks, with wrought Screw, Nickel-plated, old Gold in-laid.....	4.12
281, Ornamental Coat and Hat Hooks, with wrought Screw, Real Bronze, per doz.....	2.62
282, Ornamental Coat and Hat Hooks, with wrought Screw, Real Brass, old Gold in-laid, per doz.....	2.12
290, Ornamental Coat and Hat Hooks, with wrought Screw, very heavy, Etruscan Bronze, per gross.....	2.30
295, Ornamental Coat and Hat Hooks, very heavy, Olympian Bronze per gross.....	2.30
296, Ornamental Coat and Hat Hooks, very heavy, Pompeii Bronze, per gross.....	2.40
297, Ornamental Coat and Hat Hooks, Real Bronze, with Real Bronze Screws, per doz.....	1.62
298, Ornamental Coat and Hat Hooks, Real Brass, with Real Bronze Screws, per doz.....	1.42
299, Ornamental Coat and Hat Hooks, Brass, nickel-plated, per doz.....	2.84

Our fancy Coat and Hat Hooks are well and favorably known to the trade, and are recognized as the best value ever offered. While they are extra fine, we sell them, as we do all our goods, at a fair profit, and not at an arbitrary one. We prefer to sell a large quantity of any article at a moderate profit than a few once in a while at a big profit. In the end we make more money by doing our business in this way.

Bird-Cage Hooks.	
No.	Per doz.
140, Ornamental Iron, 8-inch, with wrought Screw, Etruscan Bronze.....	\$0.24
150, Ornamental Iron, 8-inch, with wrought Screw, Olympian Bronze.....	.29
145, Ornamental Iron, 10-inch, with wrought Screw, Olympian Bronze.....	.30
155, Ornamental Iron, 10-inch, with wrought Screw, Etruscan Bronze.....	.27
160, Ornamental Iron, 8-inch, Swinging, Etruscan Bronze.....	.28
180, Ornamental Iron, 8-inch, Swinging, Olympian Bronze.....	.30
170, Ornamental Iron, 10-inch, Swinging, Etruscan Bronze.....	.36
190, Ornamental Iron, 10-inch, Swinging, Olympian Bronze.....	.40
154, Ornamental Iron, 8-inch, with Screw, Pompeii Bronze.....	.32
147, Ornamental Iron, 10-inch, with Screw, Pompeii Bronze.....	.40
162, Ornamental Iron, 8-inch, Swinging, Pompeii Bronze.....	.35
182, Ornamental Iron, 10-inch, Swinging, Pompeii Bronze.....	.45

These Bird-Cage Hooks are of the first quality, fine finish, design tasteful, and handsome, and sell largely wherever introduced.

## Store-Door Handles, &c.

No.	Per doz.
140, Ornamental Iron, Store-Door Handles, extra heavy, Etruscan Bronze.....	\$1.84
141, Ornamental Iron, Store-Door Handles, extra heavy, Olympian Bronze.....	1.98
142, Ornamental Iron, Store-Door Handles, extra heavy, Pompeii Bronze.....	2.11
211, Ornamental Iron, Store-Door Handles, Real Bronze, very heavy.....	8.00
375, Ornamental Parlor Match Safes, Etruscan Bronze.....	1.56
380, Ornamental Parlor Match Safes, Pompeii Bronze.....	1.82
385, Ornamental Parlor Match Safes, Etruscan Bronze.....	1.86
390, Ornamental Parlor Match Safes, Pompeii Bronze.....	1.92
376, Ornamental Parlor Match Safes, Nickel-Plated, very elegant.....	3.00
397, Ornamental Parlor Match Safes, Nickel-Plated, very elegant.....	4.00
398, Ornamental Parlor Match Safes, Nickel-Plated, Old Gold Inlaid.....	5.10
399, Ornamental Parlor Match Safes, Nickel-Plated, Old Gold Inlaid.....	4.50
475, Ornamental Real Bronze Match Safes, each.....	1.25
495, Ornamental Real Bronze Match Safes, each.....	1.75

Our Match Safes are well known, the hand-somest and cheapest ever made, and a trial will prove it to your satisfaction.

## Castors.

No.	Per set.
1 1/2-inch, No. 1, Iron Fork and Wheel, packed 1 set in paper.....	4 ¢
1 1/2-inch, No. 2, Iron Fork and Wheel, packed 1 set in paper.....	4 1/2 ¢
1 1/2-inch, No. 3, Iron Fork and Wheel, packed 1 set in paper.....	4 1/2 ¢
2-inch, No. 1, Iron Fork and Wheel, packed 1 set in paper.....	6 ¢
2-inch, No. 2, Iron Fork and Wheel, packed 1 set in paper.....	6 1/2 ¢
2-inch, No. 3, Iron Fork and Wheel, packed 1 set in paper.....	6 1/2 ¢
2 1/2-inch, No. 1, Iron Fork and Wheel, packed 1 set in paper.....	7 ¢
1 1/2-inch, No. 1, Iron Fork and Porcelain Wheel, 1 set in paper.....	5 1/2 ¢
1 1/2-inch, No. 2, Iron Fork and Porcelain Wheel, 1 set in paper.....	6 ¢
1 1/2-inch, No. 3, Iron Fork and Porcelain Wheel, 1 set in paper.....	6 1/2 ¢
2-inch, No. 1, Iron Fork and Porcelain Wheel, 1 set in paper.....	7 1/2 ¢
2-inch, No. 2, Iron Fork and Porcelain Wheel, 1 set in paper.....	8 ¢
2-inch, No. 3, Iron Fork and Porcelain Wheel, 1 set in paper.....	8 1/2 ¢

2-inch, No. 4, Iron Fork and Porcelain Wheel.	
No.	Per set.
1 1/2-inch, No. 1, Iron Fork and Lignum Vitae Wheel, 1 set in paper.....	10 1/2 ¢
1 1/2-inch, No. 2, Iron Fork and Lignum Vitae Wheel, 1 set in paper.....	10 1/2 ¢
1 1/2-inch, No. 3, Iron Fork and Lignum Vitae Wheel, 1 set in paper.....	10 1/2 ¢
2-inch, No. 1, Iron Fork and Lignum Vitae Wheel, 1 set in paper.....	12 1/2 ¢
2-inch, No. 2, Iron Fork and Lignum Vitae Wheel, 1 set in paper.....	12 1/2 ¢
2-inch, No. 3, Iron Fork and Lignum Vitae Wheel, 1 set in paper.....	12 1/2 ¢
2-inch, No. 4, Iron Fork and Lignum Vitae Wheel, 1 set in paper.....	13 ¢

## Globe Wheel Bed Casters.

No.	Per set.
1 1/2-inch Globe, Porcelain Wheel, 1 set in paper.....	8 1/2 ¢
1 1/2-inch Globe, Lignum Vitae Wheel, 1 set in paper.....	10 ¢
2-inch Globe, Porcelain Wheel, 1 set in paper.....	12 1/2 ¢
2-inch Globe, Lignum Vitae Wheel, 1 set in paper.....	15 ¢

## Philadelphia or French Casters.

No.	Per set.
1, Iron Horn, Iron Wheel, 1 set in paper.....	4 ¢
2, Iron Horn, Iron Wheel, 1 set in paper.....	4 1/2 ¢
3, Iron Horn, Iron Wheel, 1 set in paper.....	4 1/2 ¢
4, Iron Horn, Iron Wheel, 1 set in paper.....	5 ¢
5, Iron Horn, Iron Wheel, 1 set in paper.....	5 1/2 ¢
1, Iron Horn, Lignum Vitae Wheel, 1 set in paper.....	5 1/2 ¢
2, Iron Horn, Lignum Vitae Wheel, 1 set in paper.....	6 ¢
3, Iron Horn, Lignum Vitae Wheel, 1 set in paper.....	6 1/2 ¢
4, Iron Horn, Lignum Vitae Wheel, 1 set in paper.....	7 1/2 ¢
5, Iron Horn, Lignum Vitae Wheel, 1 set in paper.....	8 ¢
1, Iron Horn, Porcelain Wheel, 1 set in paper.....	5 ¢
2, Iron Horn, Porcelain Wheel, 1 set in paper.....	5 1/2 ¢
3, Iron Horn, Porcelain Wheel, 1 set in paper.....	6 ¢
4, Iron Horn, Porcelain Wheel, 1 set in paper.....	6 1/2 ¢
5, Iron Horn, Porcelain Wheel, 1 set in paper.....	7 ¢
1, Iron Horn, Brass Wheel, 1 set in paper.....	8 ¢
2, Iron Horn, Brass Wheel, 1 set in paper.....	8 1/2 ¢
3, Iron Horn, Brass Wheel, 1 set in paper.....	9 1/2 ¢
4, Iron Horn, Brass Wheel, 1 set in paper.....	10 ¢
5, Iron Horn, Brass Wheel, 1 set in paper.....	10 1/2 ¢

## Philadelphia or French Casters.

No.	Per set.
1, Brass Horn, Brass Wheel, headed rivet, 1 set in paper.....	13 ¢
2, Brass Horn, Brass Wheel, headed rivet, 1 set in paper.....	15 ¢
3, Brass Horn, Brass Wheel, headed rivet, 1 set in paper.....	18 ¢
4, Brass Horn, Brass Wheel, headed rivet, 1 set in paper.....	23 ¢
5, Brass Horn, Brass Wheel, headed rivet, 1 set in paper.....	24 ¢
1, Brass Horn, Porcelain Wheel, headed rivet, 1 set in paper.....	9 1/2 ¢
2, Brass Horn, Porcelain Wheel, headed rivet, 1 set in paper.....	10 ¢
3, Brass Horn, Porcelain Wheel, headed rivet, 1 set in paper.....	11 1/2 ¢
4, Brass Horn, Porcelain Wheel, headed rivet, 1 set in paper.....	14 1/2 ¢
5, Brass Horn, Porcelain Wheel, headed rivet, 1 set in paper.....	15 1/2 ¢
1, Brass Horn, Lignum Vitae Wheel, headed rivet, 1 set in paper.....	10 1/2 ¢
2, Brass Horn, Lignum Vitae Wheel, headed rivet, 1 set in paper.....	10 1/2 ¢
3, Brass Horn, Lignum Vitae Wheel, headed rivet, 1 set in paper.....	12 ¢
4, Brass Horn, Lignum Vitae Wheel, headed rivet, 1 set in paper.....	13 1/2 ¢
5, Brass Horn, Lignum Vitae Wheel, headed rivet, 1 set in paper.....	15 1/2 ¢

We manufacture more bed and French Casters than any other maker in this country, and can therefore sell cheaper. We are prepared to take orders for any quantity, and can guarantee prompt delivery. Our goods are known every place and sold in endless quantities.

## Miscellaneous Goods.

No.	Per gross.
155, Sash Lifts, Ornamental Iron, Etruscan Bronze, packed with Screws.....	\$0.89
160, Sash Lifts, Ornamental Iron, Olympian Bronze, packed with Screws.....	1.02
162, Sash Lifts, Ornamental Iron, Pompeii Bronze, packed with Screws.....	1.12
260, Sash Lifts, Ornamental Real Bronze, with Real Bronze Screws, per doz.....	.78
300, Sash Lifts, Ornamental Iron, Etruscan Bronze, with Screws, per gross.....	.98
305, Sash Lifts, Ornamental Iron, Olympian Bronze, with Screws, per gross.....	1.12
310, Sash Lifts, Ornamental Iron, Pompeii Bronze, with Screws, per gross.....	1.24
315, Sash Lifts, Ornamental Iron, Nickel Plated, with Nickel-Plated Screws, per gross.....	3.84
320, Sash Lifts, Ornamental Iron, Nickel Plated, Old Gold Inlaid Plated Screws, per gross.....	4.12
325, Sash Lifts, Ornamental Real Bronze, with Real Bronze Screws, per doz.....	.84
600, Shutter Bars, Ornamental Iron, Etruscan Bronze, with Screws, per doz.....	.36
605, Shutter Bars, Ornamental Iron, Olympian Bronze, with Screws, per doz.....	.42
610, Shutter Bars, Ornamental Iron, Pompeii Bronze, with Screws, per doz.....	.48
615, Shutter Bars, Ornamental Iron, Nickel Plated, with Nickel-Plated Screws, per doz.....	1.28
620, Shutter Bars, Ornamental Iron, Nickel Plated, with Old Gold Inlaid, per doz.....	1.78
625, Shutter Bars, Ornamental Iron, Nickel Plated, Brass, with Screws, per doz.....	3.00
630, Shutter Bars, Ornamental Iron, Real Bronze, with Screws, per doz.....	3.60
1, Newspaper Holder, for Outside Doors, to hold Papers, Iron, Ornamental, per doz.....	6.00
Burglar Alarm Lock, for travelers, a splendid article, price each, net.....	1.00

## Tower Bolts.

No.	Per doz.
3-inch, Extra Tower Bolts.....	\$0.20
4-inch, Extra Tower Bolts.....	.22
5-inch, Extra Tower Bolts.....	.23
6-inch, Extra Tower Bolts.....	.24
7-inch, Extra Tower Bolts.....	.25
8-inch, Extra Tower Bolts.....	.26
9-inch, Extra Tower Bolts.....	.27
10-inch, Extra Tower Bolts.....	.28
11-inch, Extra Tower Bolts.....	.29
12-inch, Extra Tower Bolts.....	.30

## Chest Handles.

No.	Per doz. pairs.
51, Surface Chest Handles.....	\$0.30
53, Surface Chest Handles.....	.40
55, Surface Chest Handles.....	.60
30, Ornamental Chain Door Fasteners, 6-in., Japanned.....	\$0.80
335, Ornamental Chain Door Fasteners, 6-in., Branded.....	.08
425, 6 in. Real Bronze Chain Door Fasteners, complete, with Real Bronze Chain.....	6.25

## Blind Hinges, &c.

No.	Per doz. sets.
1, For wood, adapted to Southern trade, per case of 6 doz. sets.....	\$3.50
1 1/2, Do. do., very heavy.....	4.00
1, Blind and Shutter Hower, for bowing Blinds or Shutters at the regulation angles, per doz., complete.....	.56
100, Do. do., Ornamental, per doz.....	.75
280, Ornamental Shutter Knobs, per gross.....	2.62
285, Ornamental Shutter Knobs, Pompeii, per gross.....	2.84
305, Ornamental Shutter Knobs, Real Bronze, per doz.....	1.25
130, Harness Hooks, 5 1/4-inch, Japanned, per doz.....	.24
132, Harness Hooks, 5 1/4-inch, Japanned, per doz.....	.30
134, Harness Hooks, 5 1/4-inch, Japanned, per doz.....	.36
136, Harness Hooks, 5-inch, Japanned, per doz.....	.40

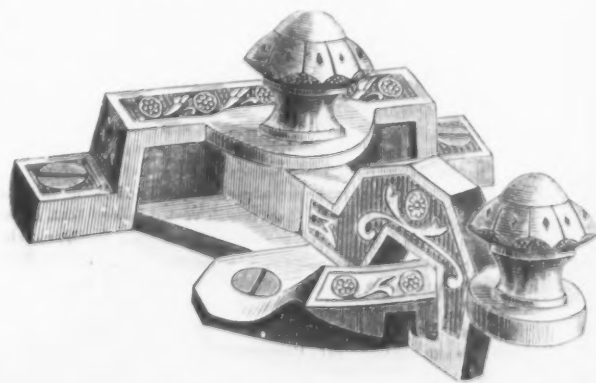
## SPECIAL NOTICE TO THE TRADE:

Our system of doing business destroys combinations, which we believe to be a curse to a free people. We believe in the fundamental principle of "every man for himself, and God for us all," and the "survival of the fittest." We have discovered some new principles of mechanics by which we can manufacture goods cheaper than others; we believe in giving the trade a share of the discovery by placing goods at such fair prices that we will at least get a fair share of the trade. The howl that was raised at first by some small dealers, incited by rival manufacturers, against our net rock bottom prices has, like all such attempts, died out, and now it has become fashionable for our rivals to use our list in making up their own. It is only a question of time, and a short one at that, when all Hardware Goods, like stocks, will be quoted in the open market at net prices. It is a relic of barbarism to compel a man in the present age of improvements to find the net cost of a staple article in everyday use by figuring out the innumerable discounts attached to it. It must go, and is going already. We are now in a position to fill orders in large or small amounts at short notice, and the trade can rely on it that our goods will compare with those of the oldest makers in this country.

We will endeavor to sustain the reputation which we have earned by doing what is right and just to all alike, favoring no man above another, giving the best value for the least money, and doing as we agree in all cases.

Send in your orders.

MANHATTAN HARDWARE CO.





# The Iron Age

AND  
Metallurgical Review.

New York, Thursday, April 1, 1886.

DAVID WILLIAMS, Publisher and Proprietor.  
JAMES C. BAYLES, Editor.  
JOHN S. KING, Business Manager.  
CHAS. KIRCHHOFF, Jr., Associate Editor.

## RATES OF SUBSCRIPTION, INCLUDING POSTAGE.

THE UNITED STATES, BRITISH AMERICA AND  
SANDWICH ISLANDS.

Weekly Edition: \$4.50 a year.  
Issued every THURSDAY morning.

Semi-Monthly Edition: \$2.30 a year.  
Issued the FIRST and THIRD THURSDAYS of every  
month.

Monthly Edition: \$1.15 a year.  
Issued the FIRST THURSDAY of every month.

### TO ALL OTHER COUNTRIES.

PER ANNUM, POSTPAID.

Weekly Edition: \$5.00—\$1—25 francs—20 marks  
—15 florins—6 roubles (coin)—25 lire—20 pesetas.

Semi-Monthly Edition: \$2.50—10/—12½ francs—  
10 marks—6 florins—3 roubles (coin)—12½ lire—10  
pesetas.

Monthly Edition: \$1.25—5/—6¼ francs—5 marks  
—3 florins—1½ roubles (coin)—4½ lire—4 pesetas.

### REMITTANCES

should be made by draft, payable to the order of  
David Williams on any banking house in the United  
States or Europe; or, when a draft cannot be ob-  
tained in postage stamps of any country.

### NEWSDEALERS OR BOOKSELLERS

In any part of the world may obtain *The Iron Age*  
through the American News Company, New York,  
U. S. A.; the International News Company, New  
York, U. S. A., and London, England; or the San Fran-  
cisco News Company, San Francisco, Cal., U. S. A.

### RATES OF ADVERTISING.

One square (12 lines, one inch), one insertion, \$2.50;  
one month, \$7.50; three months, \$15.00; six months,  
\$25.00; one year, \$40.00; payable in advance.

### BRITISH AGENCY.

Office of THE IRONWORKER, 42 Cannon St., London.

DAVID WILLIAMS, Publisher.

66 and 68 Duane Street, New York

PITTSBURGH.....77 Fourth Avenue.

PHILADELPHIA.....390 South Fourth Street.  
THOS. HOBSON, Manager.

CHICAGO.....30 and 38 Clark St., cor. Lake.  
J. K. HANES, Manager.

CINCINNATI.....S. E. cor. 4th and Main Streets.  
HENRY SMITH, Manager.

CHATTANOOGA.....Ninth and Carter Streets.  
S. B. LOWE, Manager.

## REMOVAL.

The office of this journal is re-  
moved to 66 and 68 Duane Street.

### The Knights of Labor.

The publication of Mr. Powderly's letter, relating to the abuse of the power of the Knights of Labor in the West, calls public attention to a fact which cannot have escaped the notice of thoughtful men. The growth of the order is one of the most interesting phenomena in the history of the labor movement in the United States. Statesman-like in its conception, it promised to wield an immense and permanent influence for good. It was designed to protect the interests of labor by more effective and less costly means than the rude weapon of the strike. It was to avert rather than excite disturbances, to encourage amicable arbitration in all cases of difference between employers and wage-earners, protect the weak against outrage or oppression, and prevent wrong done in the name of labor. The order had a reason for being which was immediately and widely recognized. It unified labor organizations and took under its especial care the broadly humanitarian phases of the labor question. It promised to be a great conservative force, as well as a great agent for promoting the progress of the labor movement in right and desirable directions. It was designed to work progressively from agitation to organization, from organization to education, from education to arbitration and from arbitration to co-operation. It was both feared and respected. In the light of all that experience has taught concerning it, we can discover but one weak point in its scheme of organization—it presumes too much upon the intelligence, patience and conservatism of the great body of its membership. Local assemblies were given, or have been allowed to assume and exercise, too large a measure of discretion in matters affecting the interests of the order. Mr. Powderly and his associates in the executive management of the order have long recognized this fact. They have seen the danger of just such a misuse of the power of the order as we are now witnessing on a large scale in the Southwest, and have seen illustrated on a smaller scale in many parts of the country. Doubtless they have hoped to avert the threatened danger before it attained proportions wholly beyond control. This hope has been in part, at least, disappointed. Mr. Powderly clearly recognizes that if local assemblies of the

Knights of Labor can commit the order to a course so unreasonable as that pursued by the assemblies responsible for the great railroad strike in the Southwest, in which, for the benefit of one man in Texas, the industry and trade of a populous section are paralyzed, and many thousands of men are deprived of employment, the organization is a dangerous power and one for which he can no longer afford to be even nominally responsible. He places before the order the alternative of recognizing and respecting the executive authority, or accepting his resignation. He is perfectly right. If he is forced to resign the order will go to pieces, and its vast potentiality for good will all be lost.

In its present shape the order is, as Mr. Powderly says, at once the strongest and the weakest organization in the world—strong in numbers and principles, weak in discipline and in the means of restraining ill-advised zeal. It has grown beyond the control of its organizers, and those composing the great body of its membership have not yet learned the difference between it and a trade union. Its power has been abused in so many instances that in some parts of the country its name has become a terror to all true friends of labor. This tendency cannot continue. The order is destined to fall to pieces in a very short time if it is allowed to become a mere machine for making strikes and boycotts more frequent and more destructive, and especially if it is to take up every personal grievance and make it a pretext for such performances as have been witnessed all over the country.

Whether the order will sustain Mr. Powderly or repudiate his authority is a question of very serious importance. If they sustain him, it is difficult to predict the future usefulness of the order in ways alike beneficial to employers and wage-earners; if not, the order will lash itself to shreds in a very short time. In our judgment the only way in which it is possible to restrain the present dangerous and destructive tendency will be to deprive local assemblies of the power of independent aggressive action. Their authority should be limited to the exercise of their influence in favor of conciliation and the peaceable settlement of questions originating in the trade unions. This failing, it will be time enough to call upon the executive branch for authority to set in motion the more formidable machinery of the strike and boycott. In no other way can the Knights of Labor ever hold together and the order become other than the dangerous public nuisance which in some districts it already is. The men chosen as its leaders should be patient men, wise in counsel and discreet in action. They should be as ready to protect an employer against wanton outrage as to guard a wage-earner against injustice. Certainly they must not allow the order to become a refuge for incompetent and unfaithful persons who seek to use it as a means of protection against the consequences of their own incompetence or infidelity. The order does well to make the injury of one the concern of all, but it cannot, as Mr. Powderly wisely says, afford to injure all for the sake of one—especially, as will usually be found to be the case, the man with the grievance has himself to blame for it. Employers of labor have no reason to fear an organization practicing the principles on which the order of the Knights of Labor is founded. Rather have they reason to welcome the growth of a great conservative influence to which they can look for the protection of the mutual interests of labor and capital against the hasty, ill-considered and often unreasonable demands of the trade unions. But the order in principle is a very different thing from what we find it to be in fact; and nothing will make it possible to realize the purpose of its founders that does not restrain the local abuse of its power. It would have a wholesome influence if the executive authority should annul the charter of every district assembly which does not yield a prompt assent to the propositions of Mr. Powderly's letter. If Mr. Irons, chairman of the executive board of the district assembly including the employees of the Gould roads, is correctly quoted in the newspapers, he is in open rebellion against the authority of the order. Such men are extremely dangerous. The cause of labor can gain nothing from them but distrust and opposition. The affairs of this great society have reached a crisis, and although it is quite evident that Mr. Powderly's letter was not written for publication, and least of all for discussion in the newspapers, the wide publicity which has been given it will be of benefit. He has put himself and the order right before the public. If he is sustained the order will be better understood and more trusted in future; if not, the whole structure will fall to pieces, and the man does not live who can reorganize it and hold it together.

Some attention has recently been directed to mine and tunnel ventilation by difficulties which are reported to have been experienced in the Mont Ceniz Tunnel. From all available accounts, however, it is to be inferred that it was not so much the ventilating facilities which were at fault as the character of the fuel used by the Italian company which works that section of the railway in which the tunnel lies. The company has employed Beugnot engines for the freight trains, and as these remain in the tunnel a comparatively long time it has

twice happened that the railroad officials accompanying them have suffered from serious symptoms of asphyxia. The sufferers, however, promptly recovered on getting out of the tunnel. Immediate complaints were made and both engines and fuel were changed. Since this was done no inconvenience has been reported. There seems, accordingly, to be little reason for the criticism to which the defenders of the Mont Ceniz Tunnel have been subjected, and suspicion as to the merits of the ventilating systems adopted is entirely without foundation.

### The Lake Superior Mines in 1885.

When a year since we reviewed the position of the leading Lake Superior mines with the object of ascertaining their capacity to meet low prices, the outlook was discouraging indeed. The sliding-scale sales netted to those acting in harmony with the Calumet and Hecla Co. only about 9.80 cents a pound for the lowest month. This was lower than all but two could produce at and the future looked very gloomy. The mines did better during the balance of the year, and from the annual reports published it is apparent that the average price realized for 1885, including probably a quota for export, was a fraction over 11 cents. The Lake mines have, it is true, ceased to hold that commanding position which once they occupied. The following table giving the production of the whole country and of these mines, in net tons, well illustrates this:

Year.	United States.	Lake Superior.	Per cent.
1870.....	14,111	15,000	57.3
1875.....	30,160	18,000	59.9
1879.....	36,700	21,424	18.3
1880.....	30,240	24,808	82.5
1881.....	35,840	27,286	76.1
1882.....	45,381	32,401	71.4
1883.....	57,720	29,851	51.7
1884.....	72,478	34,677	47.7
1885.....	82,583	36,074	43.5

While, therefore, in 10 years the output has doubled, the percentage has fallen off to less than a half. It is, of course, not fair to state that the power of the Lake companies has waned in the same proportion, because by the high quality of the copper and the comparatively large proportion retained at home they still occupy undoubtedly a leading position in our markets.

The result of the low prices has been to crowd out the smaller companies, while the larger ones have nearly all of them increased their make in order to cheapen cost. The following table, in which the net ton is the unit, will illustrate this:

Production of the Leading Lake Superior Copper Mines.	1882.	1883.	1884.	1885.
Calumet and Hecla.....	16,000	19,500	19,900	20,000
Quincy.....	2,833	3,008	2,840	2,924
Oscuela.....	2,088	2,128	2,124	2,124
Franklin.....	1,632	1,745	1,574	2,004
Atlantic.....	182	300	964	1,121
Aloues.....	1,215	1,841	1,882	1,791
Central.....	677	634	718	1,071
Aloues.....	540	878	966	1,085

The falling off in the product of the Oscuela is due to a stoppage of some months to transfer the stamp mill from one site to another. The effect of this increase of production, and of other efforts to reduce cost, is reflected in the following table, which includes those mines whose annual report has been issued thus far:

Cost of Production in Lake Superior Mines.	1881.	1882.	1883.	1884.	1885.
Quincy.....	10.90¢	9.50¢	9.44¢	8.63¢	7.50¢
Oscuela.....	12.97¢	12.31¢	11.34¢	10.90¢	10.00¢
Franklin.....	13.40¢	12.37¢	11.63¢	10.08¢	9.25¢
Atlantic.....	13.68¢	12.80¢	12.67¢	10.78¢	9.25¢
Aloues.....	19.33¢	17.89¢	15.98¢	12.43¢	11.28¢
Huron.....	.....	.....	14.78¢	11.75¢	.....

The Calumet and Hecla does not publish a detailed report, but its net cost, excluding new equipment, would lay its management open to the charge of reckless extravagance if it were above 6 cents. The figures given above include the cost of marketing, commissions, &c. In the case of the Aloues the 1884 figure refers to the last three months of the year, and the 1885 to the first five months, after which the mine went into the hands of lessees.

The factors affecting the cost are, of course, very numerous, prominent among them being the regularity of the dissemination of the copper in the vein, the hardness of the rock, the extent of the ore bodies, &c. The two principal points, however, are the percentage of copper and the hardness of the rock. There are two classes of veins—the harder conglomerate, to which belong the Calumet and Hecla and the Oscuela, and the softer amygdaloid. Within what a wide range the grade fluctuates may be appreciated by an examination of the following table:

Percentage of Yield of Ingot Copper.	1881.	1882.	1883.	1884.	1885.
Cal. and Hecla.....	4.0	4.5	4.7	4.7	4.7
Quincy.....	2.62	3.31	2.70	2.70	2.51
Oscuela.....	1.29	.....	1.21	1.17	.....
Franklin.....	1.10	1.39	1.45	1.46	.....
Atlantic.....	0.72	0.69	0.75	0.74	.....
Aloues.....	0.95	0.87	0.87	0.82	.....
Huron.....	.....	.....	1.45	1.18	.....

It will be observed that it is possible, therefore, under careful management to produce copper as low as 37¢, like the Atlantic when running on soft rock yielding only 1/4 of 1 per cent. of ingot copper, a feat which we believe is unparalleled in copper mining.

A glance at the figures of cost which we have given will convince the metal trader that under present conditions the large companies are not likely to reduce output. They are making money, nearly all of them, although it cannot be said to be a due compensation on capital invested in a business so risky as mining, even if reduced to the system prevailing in Lake Superior. So far as that district is concerned the production will go on. It may increase a little this

year, though it is not likely that there will be any sudden expansion. That is largely a matter of equipment, for which provisions have not as yet been made beyond those carried out in 1884 and early in 1885.

### The Central American Republics.

Since Central America is bound to become in the near future a most important international highway, the people there, for political and strategic reasons, naturally feel the necessity of a closer bond uniting them, and it is evident that for the sake of mutual protection a Central American union as it once existed will become imperative. Community of resources, railway and telegraphs and the commanding position between two oceans will commend and at the same time facilitate such union. A glance at the distribution of the area and population in Central America shows wide differences in both:

	Square km.	Inhab. Panta.	Per square km.
Guatemala.....	121,140	1,384,604	10
San Salvador.....	17,720	618,378	30
Nicaragua.....	133,800	275,815	2
Honduras.....	120,420	351,701	3
Costa Rica.....	51,760	210,177	4
Total.....	445,900	2,735,570	6

Guatemala, with a large Indian population, is the most populous of the five States, although but little larger than Honduras. San Salvador, only about one-seventh the size of Guatemala, counts a population nearly half the size of that of the latter; San Salvador, indeed, chances to be the most densely populated country, not only in Central America, but in all Spanish America. The number of votes which little San Salvador would have in a future Central American Congress would consequently be an element not to be overlooked by Nicaragua, Honduras and Costa Rica, and may prove one of the obstacles in the way of a future Union which in many respects would be a desideratum. In time of peace the army and militia are distributed as follows:

	Army.	Militia.
Costa Rica, men.....	500	3,500
Guatemala.....	2,500	20,000
Honduras.....	500	3,000
Nicaragua.....	500	4,000
San Salvador.....	1,300	10,000

The income of Costa Rica in 1884 was \$1,864,025, and the expenditure \$1,985,426. The budget for 1885 fixed the former at \$2,559,886, and the latter at \$2,559,876.

Foreign Trade Movement in 1883.	Import.	Export.
England.....	\$900,000	\$1,165,000
France.....	261,000	273,000
Germany.....	97,000	364,000
United States.....	730,000	661,000
Other countries.....	\$2,082,000	\$2,432,000

Maritime Movement in 1883.	Steam-ers.	Sailing-vessels.	Tonnage.
Entered at Punta Arenas.....	80	15	125,340
Entered at Limon.....	72	25	102,325

Railroads in 1883, 112 miles in operation. Telegraphs in 1883, 369 miles in operation.

Guatemala's income in 1884 was \$6,318,947; outlay, \$8,116,550; public debt, January 1, 1885, \$8,705,558. Import in 1884, \$3,282,000; export, \$4,038,000. Vessels entered in 1884, 272. Railroads, 73 miles; telegraphs, 292 miles; post offices, 144; mail matter in 1883, 2,111,366 items. The budget of Honduras for 1884, \$1,100,000 income and \$1,004,567 expenditure; public debt, \$750,000. Import, \$1,500,000; export, \$1,600,000. Railroads in 1883, 70 miles; telegraphs, 1350 miles; post offices in 1883, 28; mail matter, 299,614 items. Nicaragua's budget for 1884—income, \$3,238,363; outlay, \$3,109,400; public debt January 1, 1885, \$908,707. Import in 1883—\$4, \$3,794,981; export, \$4,904,648. Railways, 91 miles; telegraphs, 788 miles; post offices, 100; mail matter, 645,919 items.

The income of San Salvador in 1884 was \$4,067,000; expenditure, \$4,057,000; public debt, \$4,621,489.

Foreign Trade Movement in 1884.	Import.	Export.
England.....	\$857,000	\$2,124,000
France.....	286,000	274,000
Germany.....	262,000	818,000
Italy.....	21,000	261,000
United States.....	623,000	1,413,000
Columbia.....	22,000	31,000
Other countries.....	198,000	344,000
Total.....	\$2,647,000	\$6,068,000

Railroads, 55 miles; telegraphs, 48 offices; length of wire, 441 miles.

It will be seen that none of the five Central American Republics owes much money, and that in several of them the entire public indebtedness does not exceed the revenues of a single year; further, that there are in operation comparatively few railroads, but telegraphs to a respectable extent. If a well-constituted union were formed, sufficiently strong to inspire confidence abroad, it would not be difficult after a while, we presume, to procure money enough abroad for the building of railways and other public improvements such as the deepening of rivers.

The climate of the great mountain plateau is pleasant and healthy, while the soil cannot be excelled in fertility anywhere. Honduras is, moreover, distinguished for the rich gold mines that are being worked there, by New York capital in particular. Bordering on Mexico toward the north, Central America will soon be linked to the Mexican-American railroad system through Guatemala. Till now American trade has been carried on with Central America on the Atlantic by means of sailing vessels—it will

then partially avail itself of rail—while for the past 40 years the Pacific Mail Steamship Co. have kept up regular communication by steamer from New York and San Francisco. The future of our commerce with Central America will offer as great advantages as our commercial intercourse with Mexico already does; nay even greater, inasmuch as Central Americans manufacture hardly anything themselves, while Mexicans turn out a number of goods on which they lay higher protective duties.

American Trade with Central America.  
Fiscal Year. Import. Domestic export.  
1883.....\$5,121,315 \$1,588,518  
1884.....6,161,227 2,064,738  
1885.....6,409,015 2,667,943

In bulk the increase since 1883 must even have been greater. Of coffee alone we received 36,811,072 pounds in 1885.

### Will Employers Organize?

A dispatch from Chicago, under date of March 23, contains the following:

A movement is on foot and letters are being sent out quietly to arrange for a national meeting of business men and manufacturers, to be held some time next month, to take action toward devising means of defense against the power of organized labor. There is nothing definite yet arranged, but the opinion of business men is being asked in confidential circulars which speak of "outrageous demands" made by workmen, and suggest action to meet these demands and put employers in a position to withstand them.

We know nothing of the particular movement to which this dispatch relates, but we are unalterably of the opinion that, until the employers of labor form themselves into a strong organization or system of organizations, comparable in some degree to the Knights of Labor, there will be no chance for the attainment of an equilibrium in which the rights of both labor and capital shall be respected. Capital is proverbially timid and selfish. It has denied itself all the advantages to be enjoyed as the result of co-operation among the employers of labor. But even cowardice changes to courage when the instinct of self-preservation prompts to action, and narrow selfishness may seek the end it has in view by adopting, when necessity demands, the policy which enlightened self-interest would have suggested at the outset.

The individual employer, whatever his resources of capital or cunning, cannot compete single-handed with organized labor. This was possible, perhaps, when trades were independently organized and strikes were, of necessity, local in their scope and effect. All this is changed now. We see how a local, and even a personal grievance, like the discharge of Hall, the machinist, in Texas, can precipitate a strike over a vast railroad system, involving lines in no way connected with the one whose managers committed the offending act, save as parts of the same transporting system. We have seen in many instances how the lightning from a local storm cloud in the industrial sky, can strike hundreds, and even thousands, of miles from the seat of disturbance. We have witnessed the operations of the boycott, and have learned from experience how wide an influence it is able to exert in disturbing the natural course of trade. The employer of labor who fancies that, single-handed, he can cope with this vast, complex, highly organized force, overrates his strength. Without the moral support of an organization as complete as that which labor, with astonishing patience and self-sacrifice, has perfected, employers are practically helpless. Their only recourse is to close their works and leave them closed; but this is a heroic remedy which can be applied in comparatively few instances.

Realizing the possession of a power beyond the reach of the law, and which, in the absence of organization among employers, is practically irresistible, it is not surprising that labor makes unreasonable demands. In fact, its demands are becoming more and more unreasonable as the machinery for enforcing them becomes more and more effective in operation. This is tending steadily in one direction. The evil may, and probably will, cure itself; but if labor has all the power it will conquer itself only by wrecking all forms of business depending upon the co-operation of capital and labor. Labor is as selfish as capital, and vastly less intelligent. It lives in the present, and loses sight of the future. Possessing a formidable power which no power now existing is prepared to oppose, it is not surprising that it revels in excesses. A mob which finds itself in possession of a town is almost always seized by the spirit of devilry. It follows the beck of any self-constituted leader, and seems to delight in wanton mischief. To kill, burn, destroy, obliterate and deface is its cruel pleasure. Something of this spirit is shown just now by labor. It has secured a power it cannot control, and does not know enough to use it wisely. It seems to ferment strife in the spirit of very wantonness. Mr. Hoxie, in his letter to Mr. Powderly, refusing the official services of that gentleman, very properly describes the Missouri Pacific trouble as a strike without a redressible grievance, entered into without notice, continued without reason, and attended with a wanton damage to the company and to all industrial and commercial enterprises dependent upon its service. This describes a great many strikes. Having the power, the men cannot repress a desire to use it. If they have no grievance they make one. The discharge of a worthless, drunken incompetent masquerading under



the name of mechanic and using the union he disgraces as a shield to avert the consequences of his own vicious habits, is pretext enough, when one is sought, to throw a hundred thousand men out of work and render a hundred millions of capital unproductive. Labor, if left unrestrained, will sooner or later dash itself to pieces, but meanwhile it can substitute anarchy for order and mob rule for government, and we cannot safely leave the problem to solve itself, considering the methods by which the solution is likely to be reached.

No one who feels an intelligent sympathy with the efforts of the working classes to improve their condition, can fail to be struck with the fact that the present one-sided contest is likely to be fatal to the interests of both labor and capital. The true labor reformer would welcome the organization of an opposing power, as the friend of peace would welcome the armament of nations averse to war if no other way could be found of checking the belligerent tendencies of those which could not resist the temptation to invade and subjugate neighboring States. The time is past when capital could oppress labor; it is now the turn of labor to oppress capital. Labor has protected its interests by organization; capital must protect its interests by the same means. The position of each will be vastly better than it is now when they stand face to face, each strong enough to be magnanimous, but neither willing to yield to unreasonable demands. From such a balance of power would result the greatest good to both labor and capital.

It is asserted that employers cannot combine effectively, since selfishness and distrust render mutual sacrifice impossible. This conclusion is perhaps warranted by the experiences of the past, but under new conditions new motives may spring into action. Nothing so quickly quells civil strife and unifies a people as a common danger. In the presence of an invading army all citizens become patriots. It may be so with employers now. The time is past when one employer could profit by the misfortunes of another. Selfishness defeats the end it seeks, and individual effort is powerless to protect the interest of capital.

We doubt if the scheme to effect, by means of a convention at Chicago or elsewhere, a national federation of employers will prove a success. The movement will have to begin as did the organization of labor—locally and by trades. The Knights of Labor would have been impossible had there not existed in every trade and locality well-organized unions to furnish its membership and be the agencies of its operations. A national union of employers will be impossible until there are everywhere strong and compact local associations representing the capital invested in production and distribution. The formation of such local associations is demanded by every consideration which can be suggested in the interest of employers. The effect upon labor, while immediately disturbing, cannot fail to be very wholesome in the near future. Even a mob becomes conservative in the presence of a sufficient police force, and labor will be less ready to play football with the interests of capital when it is known that employers have an organization for effective resistance to unreasonable or improper demands.

It is a mistake to suppose that an organization of employers would create a force hostile to the interests of labor. Quite the reverse of this may be expected. Very few employers object to doing for labor everything practicable to make the wage-earner comfortable and contented. There are, however, many who are restrained from venturing any departure from the old relation of "master and man," partly by natural conservatism, and partly by a fear that if labor gets an inch it will demand a yard. All do not feel thus. In the various departments of industry there are many interesting experiments in progress. A great many employers are doing what they can to solve the great problem, with the happiest results. A more intimate union of employers would result in increasing the number of such experiments, and many who have unsuccessfully endeavored to hold labor in subordination to the system which exacts the largest service for the least compensation, might be tempted to try a method better calculated to induce contentment. Organization would also have the effect of broadening and liberalizing the views of employers, and a better understanding could be had with labor on all subjects if the power of organization was not all upon one side.

Since the introduction of the triple-expansion engine cylinder condensation has been discussed with renewed vigor, and a number of interesting facts have been added to existing information on the subject. Yet after all that has been said and written there is an evident confusion of opinion on some of the most important points in the theory of condensation, and careful investigation is clearly needed before we can arrive at a solution of the problems which of late have presented themselves. The correctness of the condensation theory, based on the working of a single-cylinder engine, is by no means borne out by observations in connection with compound and triple-expansion engines, and it is yet a mystery why every precaution adopted to suppress condensation in the high-pressure cylinders of these types of engines has been of no avail. The limits of temperature within which the steam works are compara-

tively narrow and cannot be held accountable for the result. It has been argued that condensation to any great extent does not occur. This, however, is directly opposed by facts, as it has been found that from 30 to 40 per cent. of the steam entering the high-pressure cylinder is reduced to water. These are conclusive figures. Another peculiar circumstance is found in the fact that no condensation occurs in the low-pressure cylinder, notwithstanding the several conditions in its favor, but that on the contrary it re-evaporates the water carried into it, thus to a certain extent performing the function of a boiler. What is to be ascertained, therefore, by experiment is the actual rise and fall of temperature in the surface of the metal of a cylinder. In a thoughtful article on the subject, published in a recent issue of the *Engineer*, a number of suggestions are offered in the matter. The measurements to which we refer, it is there remarked, could be made by inserting a thermopile, properly designed, in the cover of a cylinder, and causing it to actuate a pencil moving on a drum on which the curve of temperature would be traced. Practical application of this method would naturally not be free from great difficulties, but a satisfactory conclusion would obviously yield results of the utmost importance.

The distressing condition of the French iron and steel trade during 1885, which still continues, is clearly shown in the returns of the production for last year, just published. The output of pig iron, which was 2,039,067 metric tons in 1882, and which rose to 2,060,430 tons in 1883, declined to 1,855,247 tons in 1884, and showed a further falling off to 1,628,941 tons in 1885, and in the last six months of that year was proceeding at even a slower rate. Of this quantity 370,593 tons were foundry iron and the balance mill pig and Bessemer or Thomas iron. The bulk was made with coke as fuel, the returns showing a make of only 32,586 tons of charcoal pig and 17,179 tons produced with a mixture of both fuels. Rolled iron, too, declined in quantity, 1882 starting with 1,073,021 tons, followed by 1883 with 978,917 tons, 1884 with 876,751 tons and 1885 with only 771,299 tons. This latter figure includes 469 tons of iron rails and 110,392 tons of plates and sheets, the balance being merchant iron and shapes. The output of steel held its own remarkably well. It was 458,238 metric tons in 1882, rose to 521,820 tons in 1883, dropped to 502,908 tons in 1884 and recovered to 527,048 tons in 1885. The production of rails was 356,209 tons in 1885, against 371,432 tons in 1884 and 391,277 tons in 1883. Besides this the Bessemer and open-hearth works turned out 47,154 tons of plates and 96,573 tons of bars and shapes. This, too, shows the evidences of a growing consumption of steel for other purposes than rails, a tendency which the English statistics and the returns for our own country exhibit so clearly. The French statistics to which we refer show that the production of merchant and other open-hearth and Bessemer steel other than rails and plates rose from 34,190 tons in the first six months of 1885 to 62,383 tons in the second half.

The news from England concerning the copper markets there are full of encouragement in one sense. Early during last month 1200 tons of Anaconda matte sold at 8/ per unit, or 6d. more than ever realized on furnace contracts. Not quite two weeks later a further quantity of 1000 tons of 65 per cent. Anaconda matte was taken at 8/3. It is evident therefore that the slaughtering of Montana produce has stopped, and that the miners of that section will be able to obtain a better return. On the other hand it is announced that not less than 6000 tons of Wallaroo copper have been sold chiefly for the French market at about £15. This Australian brand is the one which has always ranked in Europe next to our Lake Superior copper, and it is stated that the purchase was made to supply its place, on the ground that Lake was too dear. This simply means that about a like amount of Lake will not be wanted, and that therefore a larger proportion of our product will be retained in this country. It is stated also that 500 tons of American copper held abroad are to be returned to us. These facts indicate that, as we pointed out some time since, our markets and those abroad may part company. We may witness a rise in London and yet see the metal stationary here. Our market is so much above others that a gradual leveling seems inevitable.

#### WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., March 30, 1886.

Mr. Morrison says that a tariff bill in a modified form will be submitted, while Mr. Hewitt asserts that a bill based on the idea of free raw materials will be passed. Mr. Mills urges that a bill covering certain elementary steps will be prepared, while Mr. Randall is credited with saying that a bill without the metal schedule and embracing certain raw materials and the textile schedules will receive very general support. The chief hitch in the negotiations pending between the two wings of the majority grows out of differences on the expediency of attempting at this time to place iron ore and wool on the free list. From present indications it would be safe to say that iron ore will not be made free on account of the formidable opposition it would combine against the bill. Some of the ultra free traders are proposing by way of compromise a reduction of the duty on iron ore to 50 cents a ton. The chances

are, however, that enough votes in committee will be secured to defeat this, and thus eliminate from the new bill every item of the metal schedule. The proposition to put wool on the free list is in the same position as to the question of expediency. Should the free-wool motion prevail, it is believed that enough strength can be rallied to defeat it in the House. The iron men would make common cause with the wool men. No time has been fixed approximately for the formal consideration of the new bill in full committee. It is apparent that nothing will be done until both wings of the party shall have agreed to the terms of the measure. The ultra members of the committee have been in frequent conference with Mr. Randall and his friends. This fact alone would be ample ground for the declaration that a bill will be formulated which will cover the ground.

#### FREE SHIPS.

The report of the majority and minority of the Committee on American Shipbuilding and Shipowning Interests, on the purchase of foreign-built ships, presents the two sides of that question with very different feelings. The majority report begs the question from beginning to end. It admits the wisdom and beneficence of the policy of protecting American shipbuilding, which was inaugurated by the first Congress, in the act of July 4, 1789, and which was reaffirmed in the act of December 31, 1792, which has been the law ever since. The majority, however, on the authority of modern economists, think that the policy of that particular method of protecting our shipping interests has exhausted itself. They have discovered that "this manifestly unwise and most unenlightened policy as to shipbuilding particularly has been abandoned for more than a quarter of a century by all the maritime nations of the globe except the United States," but fail to have discovered that the real cause of the decline of American commerce was the blow it received from British cruisers, under the Confederate flag, 1861-65. The committee claim that the important interest involved is not shipbuilding, but the ocean carrying trade, our own foreign commerce aggregating \$1,600,000,000, the earnings of which, they say, are \$200,000,000 per annum. They omit, however, to show how these vessels are to be run in competition with foreign vessels at the present rate of American wages. They assume that free ships will enable the surplus wheat to be carried to Liverpool cheaper than lessening the force of the competition of Russian and Egyptian wheat. An examination of the figures, however, shows that by no legislative legerdemain can the great granaries of the Northwest be brought within the margin of through ocean freights from India, Egypt or Russia, with a first cost of product based upon 10 cents a day for labor. The expansion and diversification of the American markets is the only sure-paying market for American cereals. It is even prophesied that the surplus wheat of India, Egypt, Russia and Roumania, under the impetus given to production by means of British capital, will in a few years be competing with our home product in the seaports of our Atlantic seaboard.

The minority of the committee show that placing ships on the free list would be placing there a completed manufacture of the most complicated character, while every other completed manufacture is dutiable to the extent of at least 30 per cent; that, notwithstanding the material of cotton manufacture is free, a duty of 30 to 40 per cent. on imported fine cotton goods still renders it difficult for American mills to compete with foreign goods, and yet the labor and material to build an iron steamship are vastly greater. The report shows that, with American wages as they are, iron shipbuilding in the United States would come to an end, and British shipyards and British workmen would do the work. The minority report says that over 4,200,000 tons of American-built ships engaged in foreign and coastwise trade, twice the tonnage of any other nation except Great Britain, attest the magnitude of the interest which this bill assails. It shows that the first cost of the vessel is not the chief element, but the increased cost of running it after it is built. The necessity of a merchant marine is not to be viewed alone from the standpoint of the profits of the carrying trade, but also from the considerations of national safety and defense.

#### REPRESENTATIVE HEWITT ON THE TARIFF.

Mr. Hewitt, of New York, the only person of the majority of the Committee on Ways and Means who has any practical knowledge of the operations of a tariff upon manufacturing industry, said to the correspondent of *The Iron Age*: "A tariff bill will pass the House during the present session, and may pass the Senate, but it will be a bill which will begin at the root of tariff revision, and not at the branches. I have always insisted that the first step must relate to raw materials, the admission of which will cheapen production without affecting labor. I have been much criticised at different times for tariff bills for which I have not been responsible. In a measure undertaking to enter the more complicated branches of tariff adjustment like manufactured or finished articles it would be well to canvass its operations beforehand. In the schedule of metals, for instance, there are 55 Members of the majority in the House who represent constituencies more or less interested in iron and steel industries. The universality of iron and steel manufacture is remarkable and does not extend to any other branch of productive industry, such as textiles, pottery, earthenware and glassware. For my part I always have insisted upon free raw materials and nothing more for the present. I believe if we can get raw materials free of duty it will enlarge the range of production." Mr. Hewitt said that he believed in maintaining the standard of American labor, and he thought that free raw materials would do it. He also thought that the labor engaged in the exploitation of raw materials in cases where work could not be carried on profitably would be observed in other industries. Mr. Hewitt is evidently determined to do all he can to give his propositions for what he terms a logical treatment of the tariff in the direction of lower duties a practical test. He then proposes to take up manufactures.

The report of the House Commission on Ordnance and Gunnery recommends that all guns for use in the army and navy, including those for fortifications, should be constructed in the United States. They also recommend that the Government confine itself for the present to guns from 8 to 12 inch caliber. The Cambria and Midvale companies ask about \$500 per ton for steel forgings. Appropriations should be sufficient to enable two independent concerns to set up the necessary plant. Respecting modern armor, the present capacity of our works is a plate about 12 inches in thickness, but several firms will contract to produce any thickness required. The only definite offer thus far is from Benj. Atha & Co., of Newark, who want an order of at least 5000 tons per year for five years at \$500 per ton.

#### Wire-Drawing Without Pickling.

At the meeting of the German Association of Ironmasters, held at Düsseldorf on December 13, 1885, a paper on "Wire Drawing Without Pickling" was read by Dr. Wedding, mining counsellor, of Berlin. Despite the very high reputation enjoyed by Dr. Wedding in the iron and steel trade all the world over, and the fact that the paper was full of data of the very highest interest, there can be no doubt that it must have tended to propagate some inaccurate and erroneous views. Upon this ground Herr Bädeler, manager of the Werderhöl Works, in a paper read by him on February 10 before the District Association of German Engineers at Hagen, entered at full length upon all the circumstances connected with the question of wire-pickling, and, in doing so, sought to refute the views propounded by Dr. Wedding. Having given a full report of Dr. Wedding's paper at the time, we have no doubt that our readers will feel interested also in the views entertained on the subject by such a competent man as Herr Bädeler. He remarked that Dr. Wedding seemed to think that annealing and pickling formed a very essential portion of the cost of wire-making, and that a great advantage would be derived from doing away with this part of the cost of manufacture. In stating that, in the process of wire-drawing, annealing and pickling takes place five times Dr. Wedding must have labored under a considerable misapprehension. A very large proportion of all the wire manufactured comes in its finished state direct from the rolling mill, and this quantity cannot be less than from 70 to 75 per cent. of the aggregate output of wire. Such wire is used for fencing,\* for telegraphic purposes, for making cables, wood screws and chains and for numerous other purposes. This wire is never annealed, except when required for special purposes, and by far the largest portion of it never passes through the fire more than once. Such a thing as annealing it five times is not likely ever to have taken place.

The writer of the paper further remarked that the process described by Dr. Wedding for making the finer numbers of wires may have been in use some 30 or 40 years ago, but that at the present day this method is entirely obsolete. Between the years 1840 and 1850 it was usual to roll wire from 6.5 to 6.8 mm. thick. At that time it would have been no doubt annealed, but not pickled, four times, seeing that acids were much too expensive in those days. Herr Bädeler gave a circumstantial account of the very complicated process formerly in use, and in doing so pointed out that long before the introduction of the Bessemer and the Thomas-Gilchrist processes, which have become very important in the manufacture of wire, even those wires intended for the finest numbers were not annealed and pickled more than three times. But many wire-drawers have for years past left off pickling middle-size and four-strand wire. The wire is placed in an ordinary (by preference, a new) annealing vessel closed up with a double lid, the middle wire being put outside, done up in large coils, and the four-strand inside, done up in smaller coils. In this vessel they are submitted to a long and intense annealing process, so that when taken out they are almost dazzling bright.

Wire of this kind is not annealed again; it is only placed for some time in a yeast bath acidified with sulphuric acid, which, however, has not sufficient pickling virtue, so that the wire is not affected even if left there for several hours. When further drawn out to thin wire it becomes as bright as wire previously pickled and washed. The yeast vessels need only be cleaned out once a year. Thomas steel, being soft and cheap, may be used for many descriptions of wire; on this account all wire-drawers are now in the habit of using larger or smaller quantities of iron obtained by that process. This material may generally be brought down, even without annealing, to a thickness of 2.5 mm., and consequently the pickling may be dispensed with. Iron wire also is now only partially annealed when from 3.8 to 3.4 mm. thick. Modern mills, with their powerful machinery and other suitable appliances, are able to turn out wire rods of from 4.5 to 5 mm. in thickness, and even under, so that wire may now be drawn down to 2.8 or even 2.6 mm. This kind of wire may be annealed bright, like medium wire, and subjected to manufacturing processes without pickling. From all this the lecturer inferred, with a great show of reason, that annealing and pickling are not now of so much importance in wire-drawing as Dr. Wedding seemed to think.

After this the lecturer pointed out that, if pickling had for its only object to rid the wire of the scales, the process might, after all, be dispensed with altogether. The acid, if applied properly and in moderation, greatly facilitates by loosening, so to speak, the integument of the wire. This, in the lecturer's opinion, accounts to some extent or the fact that the draw-plates are less affected by wire that has passed through a pickling liquid than by such as is coated with fat. In the former the thickness is uniform throughout, while in the latter there are always discrepancies of more or less magnitude to be found. At this juncture Herr Bädeler produced several small coils of wire of 0.8 mm. in thickness, broken off from a

\* Sold as wire rods by German makers, but drawn in other countries.

larger coil. This wire had not been pickled at all, not even in the form of rolled wire. Being made of Thomas steel, it went to show that this kind of wire may well be drawn without pickling.

Dr. Wedding had stated in his paper that no practicable mechanical appliance existed for removing the coating of oxide adhering to the wire. This statement the lecturer impugned altogether. To him it seems passing strange that Dr. Wedding should have been unacquainted with a practical and extremely simple apparatus, of which a large number of specimens have been in use for many years past. The apparatus in question was first invented by Graumann, and subsequently improved and simplified by Kugel; its price does not exceed \$10. It consists of five case-hardened rollers resting in two frames, connected together with hinges, three of them being lodged in the lower frame and two in the upper. The end of the rolled wire having been inserted, the frame is closed up and the wire drawn through. If the wire be bent moderately hither and thither, the oxide is discovered in the form of dust. In this way a good hand can do 5 tons of rolled wire in 10 working hours, the piece-work rate of pay being 75 pfennigs or 9d. per ton. By this process the quality of the wire is not impaired, while a large saving of sulphuric acid is obtained. Thus, for instance, Herr Bädeler stated that at the Werderhöl Works, which are under his management, no more than 3 kg. of sulphuric acid of 60° are used for cleaning a ton of wire by mechanical means, whereas if the same quantity of wire had to be pickled no less than from 22 to 25 kg. of sulphuric acid would be needed.

Another method of cleaning wire, said Herr Bädeler, consists in stretching it beyond the limit of its elasticity. The apparatus used for this purpose consists of two drums of equal width. In one of these drums the wire is placed, and the rate of speed at which it revolves exceeds that of the distributing drum in the proportion of the required diminution of cross-section. This method lies under the great drawback that when wire is annealed soft it has not the same degree of softness throughout. Sometimes it has been stretched uniformly along several circuits, when, suddenly, a softer passage supervenes; the consequence is that this part of the wire alone stretches, and the wire breaks. Lastly, the lecturer discussed Dr. Wedding's suggestion of annealing wire in a lead bath. This method, he holds, is utterly impracticable. Dr. Wedding made his experiments at a drawing speed of no more than 2 m. per minute, whereas in modern wire works the wire is usually drawn at a rate ranging from 45 to 55 m. per minute. This alone is sufficient to show that Dr. Wedding's experiments have really no practical value. The question arises as to how long the wire ought to remain in the lead bath for the temperature of both to become alike. To ascertain this the lecturer devised a very simple and ingenious experiment. At one end of a long, low, narrow tin-plate vessel he fixed a very sensitive and very minutely divided pressure-gauge, and, having filled the vessel brimful of cold water, he dropped into it a piece of wire 2.15 mm. in diameter. The small vessel was now filled once more, and a piece of wire of the same length and thickness used, but which had been in the lead bath 15 seconds. In this way he went on until it became impossible to register further increase of temperature. The experiment went to show that a wire of 2.15 mm. diameter must remain in the lead bath from 25 to 30 seconds to take its temperature. In the case of thicker wires it is obvious that they must remain in the bath much longer. The lecturer did not continue the experiment, because he perceived that, for a wire of 2.15 mm. in diameter to pass through a lead bath at a rate of speed of 50 m. per minute, the bath must itself be at least 20 m. long or else the wire would not have taken the temperature of the bath when emerging from it. From this one may form an idea of the proportions of a wire-drawing establishment in which the work is carried on according to this method.

As regards the effect produced by the lead bath on the hardness of the wire, Herr Bädeler procured the following data with steel wire 2.15 mm. in diameter: A hard-drawn wire when loaded broke at a strain of 360 kg.; the same wire annealed in lead, cold, at 350 kg., and hot at 340 kg., is annealed bright in an annealing vessel at a strain of 155 kg. These figures are the averages of the results derived from a series of experiments made by the lecturer. They go to show that the annealing in lead produces but a very small effect upon the hardness of the wire. No doubt the effect would be greater if the wire were allowed to remain in the bath more than from 25 to 30 seconds. If wire-drawing through a lead bath were fraught with the awkward result, it was that in each instance the wire broke in a very short time, and that after a few heats the whole became deformed. Of this the hearers were enabled by the lecturer to satisfy themselves *de visu*. The lecturer was of opinion that if experiments of this kind were made on a large scale they would be excessively costly. Fortunately, there is no need of going to all that expense, since the art of wire-drawing has made immense strides within the last 10 years. Herr Bädeler concluded with the remark that the strain of competition and the powerful agency of self-interest must enable wire-drawers to greatly reduce the consumption of acid.

According to the Custom-House reports the imports of specie at this port last week were \$442,185, making a total of \$3,000,000 since January 1. The exports of specie for the week were \$1,624,290, making a total of \$19,867,081 since January 1, including \$1,321,000 in silver, as compared with \$7,605,000 for the same time in 1885. The Chief of the Bureau of Statistics reports that the total values of the exports of merchandise during the 12 months ended February 28, 1886, were \$663,723,574, and during the preceding 12 months \$748,603,201, a decrease of \$84,879,627. The total values of the imports for the 12 months ended February 28, 1886, were \$607,711,701, and for the preceding 12 months \$604,489,449, an increase of \$3,222,251.]



Swedes Iron Upholsterers' Tacks, Swedes Iron Carpet Tacks,  
Swedes Iron Looking Glass Tacks,  
Swedes Iron Gimp and Lace Tacks, Swedes Iron  
Cheese Box Tacks, Swedes Iron Basket Tacks,  
Swedes Iron Cut Tacks.

CIGAR BOX NAILS, BASKET AND CHAIR

NAILS, TRUNK AND CLOUT NAILS,

FINISHING NAILS, HUNGARIAN

NAILS, PATENT BRADS,

LATH NAILS.

## NOTICE TO THE TRADE.

AFTER getting quotations on Tacks from other parties, and *before you buy*, send us a memoranda of the goods you want (we manufacture everything on the Hardware list), giving us quantity, kind and quality, and we will send you *special quotations*.

If you are not in want of first-class goods, full weight and full count—in a word, 16 ounces to the pound—don't write us, for all of our goods are of this description, and are put up in neat and attractive form; Patent Boxes, which do not weigh more than the Tacks, assorted colors machine trimmed labels, and are first-class in every respect.

Please bear in mind that our *special quotations* are based upon the quantity you buy, the quality and kind of goods. It is therefore essential that you send these items. Very truly yours,

THE WALKLEY HARDWARE CO.,  
PLANTSVILLE, CONN.

SUPERIOR QUALITY OF IRON.

ARE MADE FROM A

Carpet and Cut Tacks

AMERICAN IRON

OUR

## "DIAMOND BRAND,"

UNIFORM WEIGHTS.

6, 8, 10, 12, 14 and 16 OUNCE.

## "CIRCLE BRAND,"

DOUBLE UNIFORM WEIGHTS.

## STEEL CARPET TACKS,

FULLY EQUAL TO SWEDES.

Manufactured only by the WALKLEY HARDWARE CO., Plantsville, Conn.

LAG SCREWS

BLANK BOLTS

BOLTS OF ALL KINDS FOR RAILROADS, BRIDGE BUILDERS,

AMERICAN-BOLT-CO-  
MANUFACTURERS  
LOWELL MASS

COTTON AND WOOLEN MILLS AND MACHINERY MANUFACTURERS.

GOLD SQUARE  
PUNCHED  
AND  
HEXAGON  
NUTS

WASHERS OF ALL KINDS



GARDEN BARROW.

We make the Cheapest Barrow ever offered, quality considered.

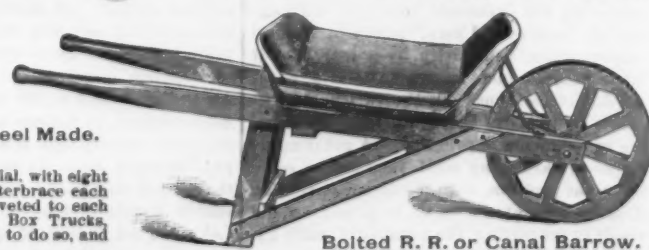
John Hearnley Manufacturing Co.,  
CINCINNATI,  
OHIO, U. S. A.

MANUFACTURERS OF

WHEELBARROWS OF EVERY DESCRIPTION.

ALL HAVING OUR IMPROVED WHEEL, WHICH CANNOT SHRINK, And Will Stand the Hardest Usage. Pronounced by all the Best Wheel Made.

It is constructed upon the most common sense principle "of thoroughly seasoned material, with eight heavy spokes and felloes." The spokes are fitted in the center of the wheel, so as to counterbrace each other, and the iron flanges "or Hub" is put on with hydraulic pressure, and thoroughly riveted to each spoke. We also manufacture a full line of Store, Warehouse, Railroad and Baggage Trucks, Box Trucks, Wagons, Skids, &c. Write us for Prices before placing your orders elsewhere. It will pay you to do so, and please mention *The Iron Age*.



Bolted R. R. or Canal Barrow.



CHARLES P. FAY'S  
PATENT SPRING  
CALIPERS and DIVIDERS.

Some of the points wherein our goods are superior to all other Spring Calipers.

- 1.—Evenness of tension. The legs when open to their fullest capacity have as much spring tension as when shut.
- 2.—The warranting of the spring not to break.
- 3.—The combining of the various legs for special purposes.
- 4.—The interchangeability of all the parts, allowing the replacing of a new leg for a broken one at slight cost.
- 5.—The superiority of the steel, from the fact that the parts are not subjected to the number of heats that forged calipers are.
- 6.—The rapid adjustment of the legs by our new hinged nut.

Send for illustrated list.

CHARLES P. FAY, Manufacturer,  
49 Taylor St., Springfield, Mass.  
WILLIAM M. HORNE & CO., Sole Agents, 74 India Street, Boston, Mass.



THESE TWO CUTS REPRESENT EXTREME SIZES OF  
Bushnell Patent Made Norway Iron Staples,  
Especially adapted to Agricultural Implement and Wagon Makers.  
NEW HAVEN (CONN.) STAPLE WORKS.

Inauguration of the New Series.

1886. Thirteenth. 1886.

CINCINNATI  
INDUSTRIAL  
EXPOSITION.

Opens Sept. 1st. Closes Oct. 9th.

The Board of Commissioners propose to make this display, the first of the new system. The Representative Exhibition of Industry and Art.

Manufactures—Art—Inventions—Products

Open to the World.

The honorable record attained by these Exhibitions since 1870, under the auspices of the Chamber of Commerce, Board of Trade and Ohio Mechanics' Institute, will be fully maintained.

NO COMPETITIVE AWARDS.

All Articles will be Entered for Exhibition Only

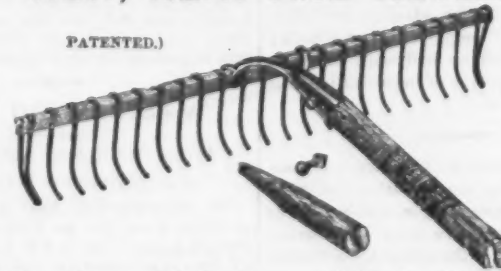
For full particulars, address

L. H. McCAMMON, Secretary.

THE GIBBS GENERAL PURPOSE RAKE.  
NEW, NEAT AND NOVEL.

For Rapid and Perfect work it is unsurpassed.

PATENTED.)



It sells on sight and cannot fail to please.

Best Lawn and General Purpose Rake Made.

No Tearing of Sod or Injury to Lawn.

MANUFACTURED ONLY BY

Gibbs Lawn Rake Co., Canton, Ohio, U. S. A.

Send for Circulars and Price List.

Look for our Popular Single Blade Post-Hole Digger in next issue.

STRAP HINGES,

70 per cent.

MANUFACTURED BY  
6, 8, 10 HEAVY STRAP.  
JAMES MANN & SONS, Buffalo, N. Y.



# Iron Age Directory

## Index to Advertisements.

Advertising Agents.	Page
Adams & Co., New York, N. Y.	14
Allen & Co., New York, N. Y.	15
Armstrong & Co., New York, N. Y.	16
Barrett & Co., New York, N. Y.	17
Bell & Co., New York, N. Y.	18
Brown & Co., New York, N. Y.	19
Clark & Co., New York, N. Y.	20
Coleman & Co., New York, N. Y.	21
Croft & Co., New York, N. Y.	22
Davis & Co., New York, N. Y.	23
Deane & Co., New York, N. Y.	24
Dodge & Co., New York, N. Y.	25
Dunham & Co., New York, N. Y.	26
Easton & Co., New York, N. Y.	27
Edwards & Co., New York, N. Y.	28
Ellis & Co., New York, N. Y.	29
Emery & Co., New York, N. Y.	30
Evans & Co., New York, N. Y.	31
Fairbank & Co., New York, N. Y.	32
Farr & Co., New York, N. Y.	33
Felt & Co., New York, N. Y.	34
Fernald & Co., New York, N. Y.	35
Fisher & Co., New York, N. Y.	36
Fitch & Co., New York, N. Y.	37
Flood & Co., New York, N. Y.	38
Flower & Co., New York, N. Y.	39
Fox & Co., New York, N. Y.	40
Frederick & Co., New York, N. Y.	41
Frost & Co., New York, N. Y.	42
Gale & Co., New York, N. Y.	43
Galloway & Co., New York, N. Y.	44
Gibbs & Co., New York, N. Y.	45
Gilbert & Co., New York, N. Y.	46
Gladwin & Co., New York, N. Y.	47
Gleason & Co., New York, N. Y.	48
Goff & Co., New York, N. Y.	49
Graham & Co., New York, N. Y.	50
Granger & Co., New York, N. Y.	51
Greene & Co., New York, N. Y.	52
Griffin & Co., New York, N. Y.	53
Grove & Co., New York, N. Y.	54
Gunsberg & Co., New York, N. Y.	55
Hall & Co., New York, N. Y.	56
Hallam & Co., New York, N. Y.	57
Halliday & Co., New York, N. Y.	58
Hallman & Co., New York, N. Y.	59
Halloran & Co., New York, N. Y.	60
Hallum & Co., New York, N. Y.	61
Hallum & Co., New York, N. Y.	62
Hallum & Co., New York, N. Y.	63
Hallum & Co., New York, N. Y.	64
Hallum & Co., New York, N. Y.	65
Hallum & Co., New York, N. Y.	66
Hallum & Co., New York, N. Y.	67
Hallum & Co., New York, N. Y.	68
Hallum & Co., New York, N. Y.	69
Hallum & Co., New York, N. Y.	70
Hallum & Co., New York, N. Y.	71
Hallum & Co., New York, N. Y.	72
Hallum & Co., New York, N. Y.	73
Hallum & Co., New York, N. Y.	74
Hallum & Co., New York, N. Y.	75
Hallum & Co., New York, N. Y.	76
Hallum & Co., New York, N. Y.	77
Hallum & Co., New York, N. Y.	78
Hallum & Co., New York, N. Y.	79
Hallum & Co., New York, N. Y.	80
Hallum & Co., New York, N. Y.	81
Hallum & Co., New York, N. Y.	82
Hallum & Co., New York, N. Y.	83
Hallum & Co., New York, N. Y.	84
Hallum & Co., New York, N. Y.	85
Hallum & Co., New York, N. Y.	86
Hallum & Co., New York, N. Y.	87
Hallum & Co., New York, N. Y.	88
Hallum & Co., New York, N. Y.	89
Hallum & Co., New York, N. Y.	90
Hallum & Co., New York, N. Y.	91
Hallum & Co., New York, N. Y.	92
Hallum & Co., New York, N. Y.	93
Hallum & Co., New York, N. Y.	94
Hallum & Co., New York, N. Y.	95
Hallum & Co., New York, N. Y.	96
Hallum & Co., New York, N. Y.	97
Hallum & Co., New York, N. Y.	98
Hallum & Co., New York, N. Y.	99
Hallum & Co., New York, N. Y.	100

Clamps.	Page
Woodruff, Miller & Co., Mt. Carmel, Ct.	15
Clippers, Horse and Barber's.	16
Lee & Son, Philadelphia, Pa.	17
Clock Springs, &c.	18
Buffalo Bros., Bristol, Conn.	19
Coal.	20
Borden & Lovell, 70 West, N. Y.	21
Coal, &c.	22
Coal, &c.	23
Coal, &c.	24
Coal, &c.	25
Coal, &c.	26
Coal, &c.	27
Coal, &c.	28
Coal, &c.	29
Coal, &c.	30
Coal, &c.	31
Coal, &c.	32
Coal, &c.	33
Coal, &c.	34
Coal, &c.	35
Coal, &c.	36
Coal, &c.	37
Coal, &c.	38
Coal, &c.	39
Coal, &c.	40
Coal, &c.	41
Coal, &c.	42
Coal, &c.	43
Coal, &c.	44
Coal, &c.	45
Coal, &c.	46
Coal, &c.	47
Coal, &c.	48
Coal, &c.	49
Coal, &c.	50
Coal, &c.	51
Coal, &c.	52
Coal, &c.	53
Coal, &c.	54
Coal, &c.	55
Coal, &c.	56
Coal, &c.	57
Coal, &c.	58
Coal, &c.	59
Coal, &c.	60
Coal, &c.	61
Coal, &c.	62
Coal, &c.	63
Coal, &c.	64
Coal, &c.	65
Coal, &c.	66
Coal, &c.	67
Coal, &c.	68
Coal, &c.	69
Coal, &c.	70
Coal, &c.	71
Coal, &c.	72
Coal, &c.	73
Coal, &c.	74
Coal, &c.	75
Coal, &c.	76
Coal, &c.	77
Coal, &c.	78
Coal, &c.	79
Coal, &c.	80
Coal, &c.	81
Coal, &c.	82
Coal, &c.	83
Coal, &c.	84
Coal, &c.	85
Coal, &c.	86
Coal, &c.	87
Coal, &c.	88
Coal, &c.	89
Coal, &c.	90
Coal, &c.	91
Coal, &c.	92
Coal, &c.	93
Coal, &c.	94
Coal, &c.	95
Coal, &c.	96
Coal, &c.	97
Coal, &c.	98
Coal, &c.	99
Coal, &c.	100

Cuppowder, Makers of.	Page
Hercules Powder Co., Cleveland, Ohio.	48
Lafayette Powder Co., 29 Murray, N. Y.	49
Hammers.	50
Buffalo Hammer Co., Buffalo, N. Y.	51
Hammers, Steam.	52
Beardsley & Cunningham, Boston, Mass.	53
Bradley & Co., Syracuse, N. Y.	54
Hammocks.	55
Empire Winger Co., Auburn, N. Y.	56
Hand Carts.	57
Adams & Son, New Haven, Conn.	58
Hand Force Pumps.	59
Union Mfg. Co., 104 Chambers, N. Y.	60
Hand Tools.	61
Field & Co., 93 Chambers, N. Y.	62
Hand Tools, &c.	63
Graham & Co., 113 Chambers, N. Y.	64
Hand Tools, &c.	65
Hand Tools, &c.	66
Hand Tools, &c.	67
Hand Tools, &c.	68
Hand Tools, &c.	69
Hand Tools, &c.	70
Hand Tools, &c.	71
Hand Tools, &c.	72
Hand Tools, &c.	73
Hand Tools, &c.	74
Hand Tools, &c.	75
Hand Tools, &c.	76
Hand Tools, &c.	77
Hand Tools, &c.	78
Hand Tools, &c.	79
Hand Tools, &c.	80
Hand Tools, &c.	81
Hand Tools, &c.	82
Hand Tools, &c.	83
Hand Tools, &c.	84
Hand Tools, &c.	85
Hand Tools, &c.	86
Hand Tools, &c.	87
Hand Tools, &c.	88
Hand Tools, &c.	89
Hand Tools, &c.	90
Hand Tools, &c.	91
Hand Tools, &c.	92
Hand Tools, &c.	93
Hand Tools, &c.	94
Hand Tools, &c.	95
Hand Tools, &c.	96
Hand Tools, &c.	97
Hand Tools, &c.	98
Hand Tools, &c.	99
Hand Tools, &c.	100

Locks and Knobs, Manufacturers of.	Page
Eagle Lock Co., 98 Chambers, N. Y.	99
McCartney & Co., Cincinnati, O.	100
Manhattan Lock Co., Reading, Pa.	101
Manhattan Lock Co., Reading, Pa.	102
Manhattan Lock Co., Reading, Pa.	103
Manhattan Lock Co., Reading, Pa.	104
Manhattan Lock Co., Reading, Pa.	105
Manhattan Lock Co., Reading, Pa.	106
Manhattan Lock Co., Reading, Pa.	107
Manhattan Lock Co., Reading, Pa.	108
Manhattan Lock Co., Reading, Pa.	109
Manhattan Lock Co., Reading, Pa.	110
Manhattan Lock Co., Reading, Pa.	111
Manhattan Lock Co., Reading, Pa.	112
Manhattan Lock Co., Reading, Pa.	113
Manhattan Lock Co., Reading, Pa.	114
Manhattan Lock Co., Reading, Pa.	115
Manhattan Lock Co., Reading, Pa.	116
Manhattan Lock Co., Reading, Pa.	117
Manhattan Lock Co., Reading, Pa.	118
Manhattan Lock Co., Reading, Pa.	119
Manhattan Lock Co., Reading, Pa.	120
Manhattan Lock Co., Reading, Pa.	121
Manhattan Lock Co., Reading, Pa.	122
Manhattan Lock Co., Reading, Pa.	123
Manhattan Lock Co., Reading, Pa.	124
Manhattan Lock Co., Reading, Pa.	125
Manhattan Lock Co., Reading, Pa.	126
Manhattan Lock Co., Reading, Pa.	127
Manhattan Lock Co., Reading, Pa.	128
Manhattan Lock Co., Reading, Pa.	129
Manhattan Lock Co., Reading, Pa.	130
Manhattan Lock Co., Reading, Pa.	131
Manhattan Lock Co., Reading, Pa.	132
Manhattan Lock Co., Reading, Pa.	133
Manhattan Lock Co., Reading, Pa.	134
Manhattan Lock Co., Reading, Pa.	135
Manhattan Lock Co., Reading, Pa.	136
Manhattan Lock Co., Reading, Pa.	137
Manhattan Lock Co., Reading, Pa.	138
Manhattan Lock Co., Reading, Pa.	139
Manhattan Lock Co., Reading, Pa.	140
Manhattan Lock Co., Reading, Pa.	141
Manhattan Lock Co., Reading, Pa.	142
Manhattan Lock Co., Reading, Pa.	143
Manhattan Lock Co., Reading, Pa.	144
Manhattan Lock Co., Reading, Pa.	145
Manhattan Lock Co., Reading, Pa.	146
Manhattan Lock Co., Reading, Pa.	147
Manhattan Lock Co., Reading, Pa.	148
Manhattan Lock Co., Reading, Pa.	149
Manhattan Lock Co., Reading, Pa.	150

Pressure Regulators.	Page
Mason Regulator Co., 10 Cortlandt, N. Y.	151
Watson & McDaniel, Philadelphia, Pa.	152
Pumps.	153
Thos. Taylor, Cross & Speers Co., Waterbury, Conn.	154
Walker Mfg. Co., Cleveland, O.	155
Pumps, Force.	156
Power Pump Co., Lockport, N. Y.	157
Union Mfg. Co., 103 Chambers, N. Y.	158
Pumps, Makers of.	159
Douglas W. & B., Middletown, Conn.	160
Monroe Iron & Steel Co., Danville, Va.	161
Monroe Iron & Steel Co., Danville, Va.	162
Monroe Iron & Steel Co., Danville, Va.	163
Monroe Iron & Steel Co., Danville, Va.	164
Monroe Iron & Steel Co., Danville, Va.	165
Monroe Iron & Steel Co., Danville, Va.	166
Monroe Iron & Steel Co., Danville, Va.	167
Monroe Iron & Steel Co., Danville, Va.	168
Monroe Iron & Steel Co., Danville, Va.	169
Monroe Iron & Steel Co., Danville, Va.	170
Monroe Iron & Steel Co., Danville, Va.	171
Monroe Iron & Steel Co., Danville, Va.	172
Monroe Iron & Steel Co., Danville, Va.	173
Monroe Iron & Steel Co., Danville, Va.	174
Monroe Iron & Steel Co., Danville, Va.	175
Monroe Iron & Steel Co., Danville, Va.	176
Monroe Iron & Steel Co., Danville, Va.	177
Monroe Iron & Steel Co., Danville, Va.	178
Monroe Iron & Steel Co., Danville, Va.	179
Monroe Iron & Steel Co., Danville, Va.	180
Monroe Iron & Steel Co., Danville, Va.	181
Monroe Iron & Steel Co., Danville, Va.	182
Monroe Iron & Steel Co., Danville, Va.	183
Monroe Iron & Steel Co., Danville, Va.	184
Monroe Iron & Steel Co., Danville, Va.	185
Monroe Iron & Steel Co., Danville, Va.	186
Monroe Iron & Steel Co., Danville, Va.	187
Monroe Iron & Steel Co., Danville, Va.	188
Monroe Iron & Steel Co., Danville, Va.	189
Monroe Iron & Steel Co., Danville, Va.	190
Monroe Iron & Steel Co., Danville, Va.	191
Monroe Iron & Steel Co., Danville, Va.	192
Monroe Iron & Steel Co., Danville, Va.	193
Monroe Iron & Steel Co., Danville, Va.	194
Monroe Iron & Steel Co., Danville, Va.	195
Monroe Iron & Steel Co., Danville, Va.	196
Monroe Iron & Steel Co., Danville, Va.	197
Monroe Iron & Steel Co., Danville, Va.	198
Monroe Iron & Steel Co., Danville, Va.	199
Monroe Iron & Steel Co., Danville, Va.	200

Portage Iron Co., Limited, Dunelm.	Page
Portage Iron Co., Limited, Dunelm.	201
Portage Iron Co., Limited, Dunelm.	202
Portage Iron Co., Limited, Dunelm.	203
Portage Iron Co., Limited, Dunelm.	204
Portage Iron Co., Limited, Dunelm.	205
Portage Iron Co., Limited, Dunelm.	206
Portage Iron Co., Limited, Dunelm.	207
Portage Iron Co., Limited, Dunelm.	208
Portage Iron Co., Limited, Dunelm.	209
Portage Iron Co., Limited, Dunelm.	210
Portage Iron Co., Limited, Dunelm.	211
Portage Iron Co., Limited, Dunelm.	212
Portage Iron Co., Limited, Dunelm.	213
Portage Iron Co., Limited, Dunelm.	214
Portage Iron Co., Limited, Dunelm.	215
Portage Iron Co., Limited, Dunelm.	216
Portage Iron Co., Limited, Dunelm.	217
Portage Iron Co., Limited, Dunelm.	218
Portage Iron Co., Limited, Dunelm.	219
Portage Iron Co., Limited, Dunelm.	220
Portage Iron Co., Limited, Dunelm.	221
Portage Iron Co., Limited, Dunelm.	222
Portage Iron Co., Limited, Dunelm.	223
Portage Iron Co., Limited, Dunelm.	224
Portage Iron Co., Limited, Dunelm.	225
Portage Iron Co., Limited, Dunelm.	226
Portage Iron Co., Limited, Dunelm.	227
Portage Iron Co., Limited, Dunelm.	228
Portage Iron Co., Limited, Dunelm.	229
Portage Iron Co., Limited, Dunelm.	230
Portage Iron Co., Limited, Dunelm.	231
Portage Iron Co., Limited, Dunelm.	232
Portage Iron Co., Limited, Dunelm.	233
Portage Iron Co., Limited, Dunelm.	234
Portage Iron Co., Limited, Dunelm.	235
Portage Iron Co., Limited, Dunelm.	236
Portage Iron Co., Limited, Dunelm.	237
Portage Iron Co., Limited, Dunelm.	238
Portage Iron Co., Limited, Dunelm.	239
Portage Iron Co., Limited, Dunelm.	240
Portage Iron Co., Limited, Dunelm.	241
Portage Iron Co., Limited, Dunelm.	242
Portage Iron Co., Limited, Dunelm.	243
Portage Iron Co., Limited, Dunelm.	244
Portage Iron Co., Limited, Dunelm.	245
Portage Iron Co., Limited, Dunelm.	246
Portage Iron Co., Limited, Dunelm.	247
Portage Iron Co., Limited, Dunelm.	248
Portage Iron Co., Limited, Dunelm.	249
Portage Iron Co., Limited, Dunelm.	250

Refrigerators.	Page
Cooper & McKee, 113 Gwinnett, Brook.	251
Grout & Co., Refrigerator Co., Saginaw, Mich.	252
Hopkins & Son, Buffalo, N. Y.	253
Refrigerators.	254
Refrigerators.	255
Refrigerators.	256
Refrigerators.	257
Refrigerators.	258











# Trade Report.

## New York Iron Market.

**American Pig.**—Reports of the condition of the market are contradictory and the situation seems slightly mixed. Some insist that Foundry Irons are duller and that outside brands are pressing more on the market. It is certain that standard brands are firm and are in moderate supply. In fact, there is little or nothing of the accumulation of stocks which is generally the rule at this season of the year. Some of the agents of Southern furnaces report some activity and there have been a number of sales of round blocks at full figures. In Forge Pig makers show a little more desire for business, but have not weakened in the least, so far as prices are concerned. We quote for standard brands, tidewater delivery, \$13 @ \$18.50 for No. 1 X Foundry, \$17 @ \$17.50 for No. 2 X Foundry, and \$16 @ \$16.50 for Gray Forge. Outside brands are 50¢ below these quotations.

**Scotch Pig.**—The market is dull and quiet. Cable quotations are irregular and higher. We quote nominally as follows for small lots: Coltness, \$20 @ \$20.50 to arrive; Gartsherrie, \$19.50 @ \$20 to arrive; Shotts and Langloan, \$20.50 @ \$21 to arrive; Carnbroe and Glengarnock, \$19.50 to arrive; Summerlee, \$20 @ \$20.50 to arrive; Dalmeny, \$19 @ \$19.50 to arrive; Eglinton, \$18 @ \$18.50 to arrive, and Clyde, \$18.50 @ \$19 to arrive. Concessions are made on 100-ton lots.

**Bessemer Pig.**—We hear of no business whatever and continue to quote Foreign, nominally, ex-ship, \$18.75 @ \$19, and Domestic at furnace, \$18.25 @ \$18.75.

**Spiegel-eisen.**—There have been no sales in this market this week, and we continue to quote nominally: 20% English Spiegel-eisen at \$27, and German \$26.50. Ferro-manganese is quoted \$67.50 @ \$68 for 80%.

**Bar Iron.**—Some of the mills in Pennsylvania making Bars, Plates and Shapes, which are dependent upon Cumberland or Clearfield Coal as their fuel supply, have either closed down or are running short time, in consequence of the strike of the Bituminous Coal miners. Common Bar Iron is weaker, owing to a slack demand and the decline in Old Rails. We quote for delivery here in round lots: Common Iron, 1.6¢ @ 1.70¢; Medium, 1.70¢ @ 1.75¢, and Refined Iron, 1.8¢ @ 1.9¢. Store prices are 1.75¢ @ 1.80¢ for Common, 1.85¢ @ 1.90¢ for Medium, and 1.9¢ @ 2.2¢ for Refined.

**Structural Iron.**—Competition continues keen on any orders that come up. We continue to quote for Angles 2¢ @ 2.10¢, delivered, and Tees at 2.35¢ @ 2.40¢ for round lots. Steel Angles are quoted 2.35¢ @ 2.45¢, according to quality. Store quotations remain 2.25¢ @ 2.4¢ for Angles, and 2.6¢ @ 2.7¢ for Tees. American Beams and Channels are 3¢ base from dock for all orders.

**Plates.**—We quote for round lots: Common or Tank, 2.15¢ @ 2.20¢; Refined, 2.4¢ @ 2.5¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢ @ 3.6¢; Extra Flange, 4¢ @ 4.1¢. For small lots of Steel Plates the quotations are as follows: Ship, 3¢ on dock; Tank, 2.5¢ at mill asked; Boiler, 3.4¢; Shell, 3.4¢; Flange, 4.4¢.

**Merchant Steel.**—Quotations for the range from ordinary to good grades are as follows: American Tool Steels, 7 1/2¢ @ 10¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; English Tool, 13¢ @ 15 1/2¢; common grades, 7¢ @ 9¢; Crucible Machinery, 4.5¢ @ 6¢; Round and Flat Spring, 2.6¢; Round-Edge Tire, 2.6¢; Square-Edge Tire, 2.9¢; Toe Calk, 2.7¢; Sleigh Shoe, 2.8¢; Open-Hearth and Bessemer Machinery, 2.8¢, with freight allowance.

**Steel Rails.**—Among the recent sales we note one lot of 11,000 tons to the Reorganization Committee of the Texas and St. Louis Railroad, distributed among a number of mills, for early delivery, at private terms. For summer delivery the usual price asked is \$34.50 @ \$35. Little flat work has yet been placed. English Rails are quoted as low as \$4.2¢, which puts them very near the importing point for Gulf and Pacific Coast delivery. In fact, we hear that English makers have had an inquiry for 10,000 tons for the Pacific Coast.

**Steel Billets.**—We hear of a sale of 5000 tons of Foreign Wire Billets at private terms.

**Steel Wire Rods.**—The market is quiet and remains nominally \$40 @ \$41.

**Crop Ends.**—We hear of a sale of 250 tons, which arrived in a sailing vessel this week, at a concession; \$22 is the usual asking price.

**Old Rails.**—The main features of the market are absolute indifference on the part of buyers and very heavy offerings of both Foreign and Domestic. Bids are asked for fully 20,000 tons of Old Rails from Northern roads and 15,000 tons from Southern roads, and efforts are being made to place some heavy blocks of English material for shipment over the greater part of the year. At present low prices in the West orders from that market are out of the question, and the tendency of this market is strongly downward. It remains to be seen, however, whether American railroads will part with

their Old Rails at lower figures, and how strongly the Foreign Rails now in store and afloat will be held. We hear of one sale of 150 tons of D. H.'s at \$21 ex ship, and of 200 tons of T.'s ex ship at \$20. We quote nominally \$20 @ \$21.

**Scrap.**—The market is quiet, with No. 1 Wrought quoted \$20 @ \$21 from yard.

**Rail Fastenings.**—On recent large orders concessions have been made. We quote Spikes nominally 2.40¢; Angle Fish Bars, 2¢; Bolts and Square Nuts, 3¢, and Bolts and Hexagon Nuts, 3.25¢, delivered.

## Metal Exchange.

The following sales are reported:

WEDNESDAY, March 24.	
5 tons Tin, May.....	90.74 1/2¢
THURSDAY, March 25.	
10 tons Tin, April.....	90.75¢
5 tons Tin, March.....	90.75¢
SATURDAY, March 27.	
5 tons Tin, March.....	90.80¢
10 tons Tin, April.....	90.80¢
MONDAY, March 29.	
25 tons Tin, April.....	90.70¢
30 tons Tin, May.....	90.65¢
15 tons Tin, March.....	90.65¢
10 tons Tin, April.....	90.65¢
TUESDAY, March 30.	
15 tons Tin, April.....	90.70¢

## Philadelphia.

Office of The Iron Age, 230 South Fourth St., Philadelphia, Pa., March 30, 1886.

**Pig Iron.**—The unsettled condition of labor has had a most demoralizing effect on the Iron market, and under present conditions there is no disposition to enter into contracts extending any length of time. Strikes appear to have become epidemic, and no one can tell when or where the next outbreak will be; consequently new business is hardly thought of, while old contracts are being completed as rapidly as possible. What the outcome will be is hard to determine, although in the meantime a great deal of what appeared to be important work has been postponed, possibly abandoned for some time to come. As regards Pig Iron, the effect so far is hardly perceptible, good brands of Iron being scarce, and, if wanted, could not be procured for immediate delivery unless in limited quantities. But the demand is very light, and confined almost exclusively to small lots for present requirements, and for such about last week's prices are realized. Outside brands are beginning to put in an appearance, however, and there is no doubt that buyers have a wider list to select from than they have had for some time. The advancing tendency, therefore, may be said to have met with a decided check, and the most that sellers hope is to duplicate sales at last week's prices. Developments during the next 30 days will be of more than usual importance, and will probably give character to the market for several months to come. There is not much room for expecting improvement, and, if the present range of quotations can be maintained without accumulating stock, makers will doubtless feel perfectly satisfied. The indications, as already stated, favor the expectation of more or less shrinkage in consumption (mainly due to strikes), and with that a corresponding increase in the supply, a feature which is already beginning to assume shape in the offerings of Southern and other outside brands. Most of the leading furnaces are well sold up and have little or nothing to spare, but apart from that offerings are gradually increasing, and proposals for forward deliveries are solicited rather than discouraged, as was the case a short time ago. Without any general change in quotations the market is easier, and prices for the week would probably show an average decline of nearly 25¢ per ton, although the amount of business done is very light. Good brands of No. 1 Foundry may be quoted \$18.50 @ \$19.50 at tide; No. 2, \$17.25 @ \$17.75; Gray Forge, \$16.50 @ \$17. Choice brands at the usual premium, and Southern brands at about \$16, \$17 and \$18 ex ship. Large buyers are not in the market at present, but it is likely that on firm offers prices could be shaded a trifle.

**Foreign Iron.**—Nothing doing. Bessemer for shipment is offered at \$19.50 @ \$20, according to brand. English 20% Spiegel, \$26.50 @ \$27; German do., \$26 @ \$26.50, but there is no demand for large lots.

**Blooms.**—There is no change in prices, and very little demand either for Foreign or Domestic. Latest sales as follows: Slabs for Nail Plate, \$30 @ \$31 at tide for Foreign and \$30 at mill for Domestic, and from that up to \$35 for higher qualities; special grades for Boiler Plates and other uses requiring high tensile strength, \$36 @ \$39. Other Blooms as follows, Charcoal, \$53 @ \$54; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$34 @ \$35, and Ore Blooms, \$35 @ \$36.

**Muck Bars.**—Demand rather light, but prices are pretty well maintained, with sales in 50 and 100 ton lots at \$29 @ \$30 at mill, price according to quality and location of mill.

**Bar Iron.**—A fair amount of business has been done considering the mixed condition of affairs. The demand has been stimulated somewhat by fears of scarcity, which is not improbable if the Coal strike continues much longer. One or two large mills in the neighborhood have stopped for want of fuel, and others are running near the danger line, so that buyers consider it prudent to keep up a moderate assortment

of stock. Prices are firm, 1.85¢ @ 1.9¢ being inside rates for best Refined Iron and 1.7¢ @ 1.8¢ for common and medium quality. Skelp Iron is in fair demand, with sales at 1.85¢ for several hundred tons.

**Plate and Tank Iron.**—A firmer feeling may be noted in this department, although new business is by no means large. There have been several stoppages by mills in the neighborhood, however, and with a very light output, and some uncertainty in regard to the future, sellers are disposed to ask outside figures. Sales at about the following quotations: Ordinary Plate, 2¢ @ 2.1¢; Tank, 2.1¢ @ 2.2¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Shell, 3.25¢; Flange, 3.5¢; Fire-Box, 4¢.

**Structural Iron.**—The demand for small lots is pretty fair; there is also some inquiry for larger lots (one for 5000 tons), but in the present unsettled condition of things no great activity can be expected. The mills are running nearly to their full capacity, but the amount of work on hand is gradually diminishing, and a new supply of orders will soon be necessary if they are to be kept busy. Prices are steady at about the following quotations: 2¢ @ 2.05¢ for Angles; 2.1¢ @ 2.2¢ for Bridge Plate; 2.4¢ @ 2.5¢ for Tees, and 3¢ for Beams and Channels.

**Sheet Iron.**—There is only a fair demand, although large orders could be had by shading prices. Manufacturers see no way of cheapening cost, and are therefore more disposed to advance their prices, particularly for the best makes. Common grades are offered at low figures, but for standard qualities prices are about as follows:

Best Refined, Nos. 26, 27 and 28.....	4¢
Best Refined, Nos. 18 to 25.....	3 1/2¢
Common, 1/2¢ less than the above.....	
Best Bloom Sheets, Nos. 26 to 28.....	5¢
Best Bloom Sheets, Nos. 22 to 25.....	4 1/2¢
Best Bloom Sheets, Nos. 16 to 21.....	4¢
Blue Annealed.....	3¢
Best Bloom, Galvanized, discount.....	60¢
Common, discount.....	65¢

**Steel Rails.**—There is a good demand for Rails, and prices are firmer, particularly for early deliveries. Large orders are offered at \$34.50 at mill, but it is difficult to place anything at less than \$35, while in some cases still higher figures are asked. Summer deliveries may be quoted firm at \$35 @ \$35.50; fall and winter, \$34.50 @ \$35.

**Old Rails.**—There is absolutely no demand at prices likely to be accepted by present holders. Buyers offer \$21.50 in the interior, but make no bids for seaboard lots, except for very limited quantities. Sellers quote \$22 spot, or \$23 in the interior, with no sales reported for some days past.

**Scrap Iron.**—There is less disposition to buy, and, while there is no quotable change in prices, it is increasingly difficult to get the outside figures, and, if sales were pushed, concessions of probably \$1 per ton would have to be made. We quote about as follows: No. 1 Wrought Scrap, \$20 @ \$22; No. 2 do., \$14 @ \$15; Turnings, \$14 @ \$14.50; Old Car Wheels, \$16 @ \$16.50; Old Steel Rails, \$20; Fish Plates, \$23.50 @ \$24.50; Cast Scrap, \$14.50 @ \$15; do. Turnings, \$10 @ \$10.50.

**Wrought-Iron Pipe.**—No new business of any moment can be reported, and present demand is confined to absolute wants. It seems to be the opinion that the short Coal supply and uncertainty of labor will tend somewhat to restrict production. Under these circumstances, though the market is quiet, prices are firm, especially so on Boiler Tubes. Orders at ruling rates are not refused, but sellers are not pushing business to any extent. In the meantime quotations are as last reported, viz.: For large lots discounts are about as follows: Lap-Welded Black, 60¢; Butt-Welded Black, 42 1/2¢; Butt-Welded Galvanized, 32 1/2¢; Lap-Welded Galvanized, 42 1/2¢; Boiler Tubes, 55¢.

**Nails.**—At the meeting of the manufacturers last week the card price fixed a month ago was continued. This action has had its effect in allaying the feverish feeling spoken of in last report, and prices are firmer. Sales are still confined to small lots, but orders come more frequently, so that the aggregate is fully up to the average of the season. Stocks in warehouses and at the mills are not large, and there is therefore no special effort made to push sales. Rates are well maintained at \$2.50, with the usual 10¢ per keg rebate for carload lots.

**Hardware.**—Inquiry among the dealers show a fair business for the week just closed. Orders are well distributed and made up of a general assortment of goods. Taking into account the season of the year and the uncertain state of the labor questions, the continued quiet but steady demand and stiffness in prices are accepted as promising larger business a little further on.

**Wood-Working Machinery.**—Manufacturers report an active demand at the present time and continued inquiries for machines for future delivery. The outlook is promising for considerable work for months ahead. Prices rule at about the same figures as have prevailed for many months past, but orders are secured more readily.

Mr. John I. Hogan has been appointed Eastern agent for the sale of the high-grade Foundry Irons made by the Struthers Furnace Co., Struthers, Ohio. This Iron is especially adapted to the manufacture of Light Hardware, Agricultural and Machine Work, Stove Plate and Ornamental Castings.

## Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., March 30, 1886.

The fact that the great railroad strike is about over has produced a more cheerful feeling in business circles within the past few days. River navigation continues in excellent condition for running Coal, and shipments are being made daily, the largest proportion of which is for the Southern markets. The shipments during the past three weeks aggregate some 13,000,000 to 14,000,000 bushels.

**Iron Ores.**—There is nothing new to note, excepting that the consumption is being increased by the starting up of additional furnaces.

**Pig Iron.**—There has been a lull in the market the past week, which was to be expected after the large sales that had been made for several weeks preceding. Some consumers have bought to cover their wants for from one to three months to come, and they will not likely buy much more during that time, but the furnaces that sold this Iron will also be out of the market, so that the one will offset the other. Prices remain unchanged; the better grades are held with considerable firmness, and the light supply of these indicates that there will be a steady market for some time to come. It is also worthy of mention that a good deal of the Marshall Iron is going into the hands of consumers, and furnacemen are hopeful that this hypothecated Iron, which has been hanging over the market for some years and used with considerable effect by those bearishly inclined, will soon be wiped out. It has been offering at from \$1 to \$2 per ton below well-established brands, and, while a good many consumers would not buy even at the difference, they use it as a lever to bear the market. We quote as follows:

Neutral Gray Forge.....	\$16.25 @ \$16.75, 4 mos.
All-ore Forge.....	17.50 @ 18.50, 4 "
White and Mottled.....	15.25 @ 15.75, 4 "
No. 1 Foundry.....	18.50 @ 19.00, 4 "
No. 2 Foundry.....	17.00 @ 17.50, 4 "
Charcoal Foundry.....	23.00 @ 24.00, 4 "
Cold-Blast Charcoal.....	25.00 @ 27.00, 4 "
Bessemer Iron.....	19.50 @ 20.00, 4 "

The sales of Bessemer Iron during the past few weeks have been unusually large; one firm is said to have bought somewhere from 50,000 to 60,000 tons at prices ranging from \$19, four months, to \$19, cash. It is but proper to state in this connection that a good deal of this Iron is to be delivered at a specified period covering the next six months. There are now but few sellers of Bessemer under \$20, four months.

**Muck Bar.**—While some of the mills are asking \$29, cash, there have been but few sales above \$28, cash, and we hear of sales having been made as low as \$27.25 @ \$27.50, cash, but no good qualities are to be had under \$28 @ \$28.50, cash.

**Manufactured Iron.**—There is continued complaint in regard to the Merchant Iron trade, which is generally reported light for the season. Demand and prices are unsettled and unremunerative. Notwithstanding the enhanced cost of production, prices are but little better. There may be a demand later on sufficient to enable manufacturers to put up prices, but the prospect at the present time is not as encouraging as it might be. Prices for best quality Iron are still quoted on a basis of 1.70¢ @ 1.75¢ for Bars, but poorer qualities, including Old Rail Iron, can be had at prices considerably lower than those quoted. A good many jobbers and consumers as well are more particular in regard to quality and are satisfied to pay the difference therefor.

**Nails.**—There is no change to note in the situation; here in Pittsburgh, where the Nail machines, owing to the strike, have been stopped for 10 months, there appears to be but little prospect of starting up soon. The next meeting of the Western Nail Association takes place to-morrow week.

**Wrought-Iron Pipe.**—There is nothing important to record; mills are all busy, and this is likely to be the situation all this year; the wants of natural-gas companies will be fully as large as in 1885, while the general demand will no doubt be up to an average. Prices firm, but unchanged; manufacturers are refusing to contract for future delivery at present prices. They are willing to book orders with the understanding, however, that the prices current at time of delivery are to be exacted. Discount on Black Butt-Welded Pipe, in carlots and upward, 45¢; less than a carload, 42 1/2¢; Galvanized do., in carlots 35¢; less than a carload, 32 1/2¢; Black Lap-Welded Pipe, in carlots, 62 1/2¢; less than a carload, 60¢; Galvanized do., in carlots, 45¢; less than a carload, 42 1/2¢; Boiler Tubes, 55¢ off regular list; 2-inch Oil-Well Tubing, 13¢ per foot, net; 2 1/2-inch Casing, 40¢; 8-inch Drive Pipe, \$1.30.

**Old Nails.**—The market continues very dull and somewhat demoralized, as compared with the date of our last report. Prices have further declined and buyers are very scarce. We hear of offers to sell at \$22.50 for Iron Rails and no response on the part of buyers. Old Steel Rails may be quoted nominally in the absence of sales at \$21.50 @ \$22 for Mixed or Short Lengths and \$22.50 @ \$23 for Long Lengths. Buyers are holding off in expectation of still lower prices; besides, the largest consumers are reported as being pretty well stocked.

**Steel.**—The Steel mills as a rule are reasonably well employed, and, while orders are not as plenty as they were a few weeks ago, it is expected that with the settlement of the labor troubles out West there will be

an increased demand. Prices remain unchanged. Standard brands Refined Cast Steel, 8 1/2¢ @ 9¢; Crucible Machinery, 3 1/4¢ @ 4¢; Boiler Plate, 4¢ @ 4 1/4¢, as to quality; Open-Hearth Machinery, 2 1/4¢ @ 2 3/4¢; Bessemer Billets and Blooms, \$32.50 @ \$34 per ton. There are no Nail Slabs being made here at present, and there does not appear to be much inquiry for them, nor can it be expected while the nailers' strike continues.

**Steel Rails.**—There is considerable inquiry and our market is reported steady at \$35.50 @ \$36.50, cash, at mill, according to delivery, &c.

**Scrap.**—Dealers report trade as being fair and prices unchanged. No. 1 Wrought Scrap, \$20 per ton; Wrought Turnings, \$14 @ \$15; Old Car Axles, \$24; Cast Borings, \$12, gross ton; Old Car Wheels, \$16 @ \$17, gross ton.

## Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., Chicago, March 29, 1886.

**Hardware.**—The only March that has favored Chicago with spring weather for a number of years is nearly ended. It has given unusual opportunity for outdoor work, which swelled the volume of trade to more than a respectable aggregate. Hardware of every description has had ready call considering the time when portions of it will be saleable, but seasonable goods, especially in the latter part of the month, were in extraordinary demand. The frost is nearly, if not entirely, out of the ground, and the erection of buildings and fences has opened up a strong call for Nails, Barb Wire, Screws, Strap and T Hinges, Staples, Chains, Shovels, Picks and Edge Tools. Prices are held pretty steady at regular discounts, with the exception of special lines which jobbers designate as "leaders." April is termed a heavy month in Hardware, and every prospect points to its realization.

**Barb Wire.**—The change in the price at the recent meeting of manufacturers has brought many inquiries on price from jobbers. Many of the retail dealers and consumers think that prices adopted by manufacturers at their meetings are merely buncombe, and write to jobbers offering to buy Wire at the former price, largely, it is presumed, with a view of determining whether the prices made by manufacturers are adhered to. Of this at the present time there can be no doubt. From all appearances it is the intention of every one interested in the sale of Barb Wire to firmly support the figures adopted, and jobbers are quoting 4¢ for Painted Wire and 4 1/4¢ for Galvanized Wire in small quantities. In carload lots they make a reduction of 1/4¢ from these figures, but when the order is exclusively for Galvanized Wire their price is strictly 1¢ advance on Painted. Letters assuring the support of these prices have been received from jobbers and makers throughout the West. Everything seems favorable to a steady market and large demand. Buying at present, however, is chiefly in small lots, for the reason that consumers are not yet fully satisfied that there will be no treachery in the ranks of the association. We are informed that it is the determined purpose of makers to keep their Wire out of the hands of brokers, which has in the past been a serious obstacle to securing uniform price. Should all the inquiries for Wire that have come into the market in the last ten days result in sales, there will be a remarkably pressing demand, which will rapidly absorb stocks on hand and put all factories into immediate active operation.

**Nails.**—The conditions of the market have changed so gradually that through a casual view it would be scarcely noticed, though there is a heavy demand for both Iron and Steel. Buying is done more in small lots, and the aggregate amount of Nails shipped does not appear so great, as fewer carload orders have been placed than usual during the month of March. The situation between makers and nailers has been so unsettled since the first of the year that jobbers have not bought in such large quantities as they thought their demand would require, and latterly their stocks have become broken, and in some cases it is now necessary to exchange sizes to fill orders complete. Makers are firmer in their prices than they were in February, and their bottom quotation is said to be about \$2.35, Chicago delivery. Jobbers are quoting on Iron Nails \$2.45 in small lots and \$2.40 in carload lots, the latter price being net, 30 days, in many cases. Steel Nails are quoted at \$2.70 in small lots from store, and in carload lots are shaded to \$2.60, according to circumstances. The latter price has become very exceptional on account of the scarcity of Nails. The attempt to boycott certain brands of Nails is being severely denounced by manufacturers, dealers and the press as an outrage upon an industry which is compelled to stand by its present prices in order to compete with the market on Eastern Nails. Inquiry among jobbers reveals no effect upon the sale of these Nails, and it is believed that no dealer will suffer by continuing to handle them.

**American Pig Iron.**—The market shows no improvement in demand. Consumers are buying principally in carload lots and propose to continue this policy during April. The contemplated adoption of the eight-hour law May 1 by labor organizations is disturbing the manufacturing classes, who are unwilling to make contracts for Finished



Goods at present prices. This consequently limits their purchases of raw material to small lots for immediate delivery, and induces them to work up stocks on hand very closely. While they acknowledge that they may be unnecessarily cautious, they feel that there is nothing to lose through this course. Prices are not likely to advance so long as labor troubles are so frequent and extensive. They also believe that a higher scale of wages will be adopted and that the cost of their product will be considerably advanced. The large contracts for Charcoal and Coke Irons which were placed last fall, together with the present carload demand, are absorbing these Irons about as rapidly as they are produced, so that there are no accumulations in the hands of furnacemen to destroy their confidence in future value. Furnacemen in Ohio and Western Pennsylvania make very little effort to dispose of their Iron in this market, as the demand from the East is sufficient to take up surplus stocks, and on which they realize better prices than they could obtain here. Quotations on Charcoal Iron are unchanged at \$22 for Nos. 1, 2 and 3 in carload lots, and \$21.50 in 100-ton lots and over; 25¢ @ 50¢ per ton advance is obtained on Nos. 3, 4, 5 and 6 in small lots. Coke Irons, All-Lake Ore, are quoted at \$19.50 for No. 1, and \$19 for No. 2; Cinder Mixed is held at \$18.50, but sales are reported at a shade under this figure; Ohio Scotch Irons are quoted at \$21, four months, and shaded down to perhaps \$20, according to quality. The Briar Hill Furnace Co. have refused to sell in any quantity at less than the top figure, four months. Others are less firm, but it is not likely that any of the furnacemen would sell at less than the lower figure. Standard Blackbands, according to quality, are quoted from \$18 to \$19.50. Southern Irons, from all appearances, are a dead letter in this market. Speculators from Cincinnati and Louisville, who loaded up on a number of the most prominent brands of this Iron during December and January, have recently canvassed this market for the purpose of selling, but were unable to find buyers who were willing to make them an offer. Those who might buy the Iron would be compelled to accept bulk delivery, which is not acceptable as a rule, and only then could they effect sales by accepting concessions which would leave them very little or perhaps no margin. At the present price of the market no buyer feels justified in incurring the risk of such an investment. Sales agents here are quoting Southern No. 1 Foundry at \$18.50; No. 2 at \$18; No. 2½ at \$17.50, and would likely sell at less than these figures. Should they therefore make concessions of but 50¢ per ton from prices quoted it would make figures equivalent to the cost of the Iron in the hands of speculators at the time they purchased it, thus showing that there is very little danger of present prices being broken by Irons held by outside parties unless they are to incur a loss on the transaction.

**Merchant Steel.**—The demand during the last week was very light and irregular. For several classes some very nice orders were placed, but, taking the line through, business was very discouraging. The demand for the better grade of Tool Steels has increased, while it has fallen off for Open-Hearth and Bessemer grades. Cheap Steels to supplement Iron have been taken by a class of manufacturers freely in small lots, but in order to make sales concessions have been frequent and large. It appears impossible to sustain a regular price on Merchant Bars, and the following quotations are made as a nominal basis: On ordinary grades of Tool Steel we quote 7½¢ @ 8½¢; Extras, 13¢; Specials, 16¢; Open-Hearth and Bessemer Spring Steel (standard brands), 2½¢; Flat Machinery, 2½¢; Round do., 3¢; Crucible Machinery, 4½¢; Crucible Cast Pile Steel, 4½¢, and Patented Pile Steel, 5½¢.

**Bar Iron.**—The market has suffered considerably in the last week from the labor agitation, as railroads have all been uncertain what the final outcome would be of the strike then in progress. Railroad companies and car manufacturers are usually the heaviest buyers, and during the time that this agitation has prevailed they have been reluctant to place orders for anything except such small lots as were necessary for repair work. Country dealers and jobbers have taken advantage of the low freight rates westward and have placed orders for stock not necessary for immediate use. The demand for small lots from other sources has been fairly good, and the market in a general way on the best grades of Iron was tolerably good, but did not increase in proportion to the first part of the month. There is also considerable irregularity in prices. Best Refined New Puddled Iron is quoted at 1.85¢, in small lots from store, and in carload lots from mill, 1.75¢ @ 1.80¢. Jobbers of this class of Iron claim that they adhere strictly to the prices, but are frequently tempted by concessions on inferior grades to break their rule. On Old Rail Iron prices range from 1.75¢ to 1.80¢ from store, and 1.65¢ @ 1.70¢ from mill. There is no regularity in their quotations, and all deals are made according to the necessity of the seller and buyer.

**Steel Rails.**—The demand during the week was more than ordinarily good. Numerous buyers of small lots are in the market, but Western mills find difficulty in making suitable deliveries. Prices continue to be quoted at \$38 for first quality and \$34.50 for seconds. The aggregate amount of sales

at these figures is not nearly so large as it would have been could all the requirements have been met.

**Structural Iron.**—The demand for Beams and Channels from store for small buildings is fairly active. A number of contracts for large lots of Bridge Iron will be let this week, but principally for points distant from this market. A great many specifications for large buildings are in the hands of our architects. Capitalists who contemplate building are waiting until the scale of wages is settled before receiving bids on material necessary for their construction. Were it not for the general agitation of the labor question business in this line would be very good, as well as in many others. Stone masons, bricklayers, carpenters and hod-carriers are organizing and demanding higher wages at such inopportune times that it is with difficulty a contractor will bind himself to complete any kind of a structure at an established price. Prices on Structural Iron remain unchanged at last quotations.

**Galvanized Iron.**—The demand from cornicemen has greatly improved and jobbers report trade in small lots fairly active. Manufacturers are pretty firm in prices demanded, and all report that they are well supplied with orders. On the best grades and brands of Iron sales agents report that their stocks are light and broken in many sizes, though their business is done in smaller lots and principally through the best class of consumers, jobbers preferring to handle a lower grade of Iron which they can sell at 60¢ off on Juniata and 60 and 10¢ off on Charcoal from store.

**Scrap Iron.**—There has been a fairly active demand for Wrought Scrap recently, and dealers' yards are pretty well cleaned up of all surplus stocks. Prices have weakened slightly under the influence of the low prices mills are required to make on Bar Iron, and a lower grade of Scrap has been saleable. On No. 1 Wrought Scrap dealers are asking \$19, but make a lower grade, which might be classed No. 2, that they will sell at about \$17.50. No. 1 Mill Scrap is quoted at \$14, and No. 2 at \$9. On Car Axles they are asking \$21.50; Horsehoes, \$23; Steel Tires and Wagon Springs are quoted at \$14; Plow Steels, \$10.50.

**Pig Lead.**—Since our last report the market has fluctuated somewhat, and sales have been made at figures ranging from 4.75¢ to 4.85¢. During the past week several small lots changed hands at 4.75¢, though 4.80¢ appears to be the nominal quotation.

## Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, March 29, 1886.

The past week has been quite uneventful in nearly all commercial circles, and nothing has occurred to awaken any particular interest in the different lines of trade. Some of the railroad lines are already declining to receive freight destined for points west of the Mississippi River, on account of the strike, but so far this has caused but little inconvenience to any of the manufacturers, who have found no difficulty in placing their products at points not affected by the strikes. The general tone of business is looking up all over the South, and the manufacturing interests are receiving accession to their ranks in almost every section of the country. There has been a general disposition among the manufacturing concerns to advance wages both of laborers and mechanics from 10 to 20%, which has been done in most instances before any demand was made upon them. A matter of some interest occurred at the Rockwood coal mines, situated 75 miles from here, on the line of the Cincinnati Southern, last Friday. The chamber that contained the hoisting apparatus caught fire and communicated to some loose coal that lay in the vicinity. It caused so much smoke that it was wholly impossible to gain access to the spot, and it was thought best to close up that particular entry. The fire was soon under control, and is thought to be out altogether at the time of this writing. The remaining entries have no communication with this one, and are not affected by it.

**Pig Iron.**—No change in the market. The truth is that most of the furnaces are sold ahead under the recent rise and there is no Iron to offer to any great amount. The demand is quiet and but little figuring is being done to effect sales. So far as can be judged, the demand and consumption are not far from the production, and as long as there is no speculative demand the market cannot do otherwise than remain quiet, with prices firm. Shipments to the Eastern markets continue to increase in volume, and frequently as much as 500 and 600 tons leave in one day for that section. Rates so far remain unchanged in that direction, and there are no indications of any change. Rates to the Northern and Western points have been modified to some extent, and there is a probability that some further concessions will be made in the near future. The demand for Pig from the Southern foundries continues good and is steadily increasing in volume. There have been quite a number of new foundries started through the South within the last three or four months. No. 1 Furnace of the Dayton Coal and Iron Co. put out 698 tons of Iron during the last week, and is gradually increasing the daily output.

**Coal and Coke.**—Notwithstanding the efforts of parties who own mines to increase the yield of Coke, there is still a scarcity of

good quality, and a number of furnaces are occasionally obliged to hold up for want of fuel. The Coke plants that are running are contracted considerably ahead, and some of them cannot sell even a carload to outside parties. Several mines are erecting new ovens, and it is thought that before long the supply will be able to easily meet all of the demands.

## Birmingham.

BIRMINGHAM, Ala., March 29, 1886.

Business moves along quietly and with fairly satisfactory results throughout this territory. In and near Birmingham the conditions of the hour are affecting nearly everything. A remarkable real-estate boom has been running for the past two weeks, measurably diverting attention from steadier business, but encouraging some lines anyhow. Mercantile towns in this part of the country have always marveled at the prices to which the industrial progress of Birmingham has brought property; but prices have been paid lately that eclipse anything that were ever asked before. In some cases margins that would ordinarily be considered fair remuneration for a holding of years' duration have been made in a few days. Vacant ground in the business part of town has felt the boom especially. As much as \$545 a front foot has been paid for lots of this character in the middle of the block, running back 182½ feet. The best explanation of such purchases as these is the outlook for a great growth in the mercantile business of the place. The first public action has been taken, too, for an important new industrial factor, being the filing of articles of incorporation for the De Bardeleben Coal and Iron Co., with a capital stock of \$2,000,000. The latter represents English money in large part, five of the incorporators being Londoners. With the exception of Mr. De Bardeleben, who lives here and who puts in the land that the company will develop, the other contributors live in South Carolina or Baltimore. All of the money is to be paid in within eight months, and two furnaces are to be built some 12 miles from Birmingham as soon as possible. Mr. De Bardeleben being now in the East making arrangements for them.

**Pig Iron.**—The market is a little puzzling. One concern has just sold 4000 tons in the East at 50¢ advance, the price being one for which the management made a futile demand some two weeks ago, while at other furnaces there is no indication of any movement of prices. Business from the West being now entirely cut off, there does not seem to be a very good demand, either. Certainly some of the stocks are larger than they have been in a good while. Sales to the East continue in moderate volume, though, one of the latest being a 400-ton transaction with New York City, and are about as much as the transportation facilities in that direction can manage expeditiously.

**Finished Iron.**—In proportion to its greater business in the West, as compared with the East, Finished Iron is feeling the effects of the Western strikes more than Pig Iron is. Shipments ready to go West have been held here for weeks now, and hardly any other business is coming from that part of the country. The mills here have recently been offered some very fair purchases in the Southwest, but unfavorable freight rates again made it inaccessible. There is no active demand, except for the comparatively small factor of local consumption.

**Miscellaneous.**—The foundries and shops are still the busiest institutions here. One unpretentious concern has taken in some \$2000 worth of orders in the last week for small articles for a tramcar to a saw weight. Another has got a jail contract from Georgia. One of the large establishments, which has just turned out two large blowing engines, has taken in its first job for the change of railroad gauge—a character of work that will keep a good many men employed from now until the first of June, and with which, according to the newspaper accounts, nearly all the shops elsewhere in Alabama are mainly engaged already.

**Nails.**—Are still stationary, \$2.45 and \$2.50 being card rates, f.o.b. at Helena and Brierfield respectively.

**Coal and Coke.**—The steam fuel business is decidedly flat, and there is not very much doing in any other character of Coal. Preparations are already in progress for a big Coke business next fall and winter. The Pratt Coal and Iron Co. have commenced work on 250 more ovens, and as soon as these are completed will proceed with the same number again.

## Cincinnati.

MARCH 29, 1886.

**Pig Iron.**—The dealers report a quiet market in the past week, prices remaining firm at former quotations. It is also reported that orders formerly booked are taking the output of the best grades of Southern furnaces, yet dealers are willing to book orders for quick or later deliveries. The Coke and Bessemer Irons of Eastern Ohio and Western Pennsylvania are attracting the attention of consumers for their strength and uniform qualities for use in machinery and other strong castings, largely taking the place of Charcoal makes. This, it is thought, will largely supply the lack of Hanging Rock Charcoal Irons, without detriment to the quality of castings heretofore made from Charcoal Iron. The situa-

tion now seems to be that all consumers will have no difficulty in supply of every grade of Iron to meet all their wants at about present prices. Quotations of sales in the past week, f.o.b. cars here; orders filled from furnaces direct will be less the freight to Cincinnati:

Charcoal Foundry.	
Hanging Rock, Best, No. 1, 4 mos.	\$21.00 @ \$21.50
Hanging Rock, Good, No. 1, 4 mos.	20.00 @ 21.00
Hanging Rock, Good, No. 2, 4 mos.	19.00 @ 20.00
Southern Tennessee, Alabama and Georgia, No. 1, 4 mos.	18.00 @ 20.00
Southern Tennessee, Alabama and Georgia, No. 2, 4 mos.	17.00 @ 18.00
Coke Foundry.	
Southern Tennessee, Alabama and Georgia, No. 1, 4 mos.	19.25 @
Southern Tennessee, Alabama and Georgia, No. 2, 4 mos.	17.00 @ 18.00
West Pennsylvania and Ohio, No. 1, 4 mos.	18.50 @ 19.50
West Pennsylvania and Ohio, No. 2, 4 mos.	17.50 @ 18.50
West Pennsylvania, Bessemer No. 1, 4 mos.	20.25 @
West Pennsylvania, Bessemer No. 2, 4 mos.	19.25 @
Silver-Gray Softeners.	
Ohio, No. 1, 4 mos.	18.00 @ 19.00
Ohio, No. 2, 4 mos.	17.00 @ 17.50
Ohio, No. 3, 4 mos.	16.50 @
Other makes and grades.	15.00 @ 17.00
Car-Wheel.	
Hanging Rock Cold-Blast, 4 mos.	25.00 @ 26.50
Hanging Rock Warm-Blast, 4 mos.	19.00 @ 20.00
Southern Warm-Blast, 4 mos.	18.00 @ 20.00
Southern Warm-Blast Standard, 4 mos.	23.00 @ 25.00
Virginia Cold-Blast, 4 mos.	27.00 @
Georgia Cold-Blast, 4 mos.	25.00 @
Forge.	
No sales reported.	
Scrap.	
Rails, no sales reported.	
Car Wheels, no sales reported.	
Wrought, sales, per 100 lb.	.50 @ .80
Cast, sales, per 100 lb.	.35 @ .70

Discount 50¢ per ton for cash from time prices reported. The strikes have a decided influence on the current business in its every branch to deaden trade.

## Louisville.

W. B. BELKNAP & CO., Louisville, write as follows, under date of March 29: A week of mild weather has gone a long way toward encouraging farmers, and has expanded trade into fair volume. There has been an extremely active demand for all sorts of agricultural supplies and builders' goods. There is more building than usual projected in our own city this season. The houses to be put up are not of any expensive character, but designed to accommodate families of moderate means. The supply of this kind has for several years been inadequate to the demand; meanwhile large expensive houses have gone begging for occupants. The local shops seem well employed with work, and so far there has been no labor trouble worth mentioning in our city. The demand for increased pay by the painters and tanners was in most cases granted. There have been various threats of the St. Louis disease extending this way, but so far nothing has developed. Much will depend on the issue there. The politicians seem afraid to tackle the question as vigorously as it requires, although we think all must admit the rights of property when questioned. The New York *Evening Post*, we think, puts it well when it summarizes the case as follows: "The right of another man to stay in your employment on his own terms, or, in other words, the right of trades unions to billet laborers on any one they select for as long as they please, which is now the central doctrine of the labor gospel, is one which civilized communities will no more accept peaceably than they will accept the Koran or the Mormon Bible." Chief Engineer Arthur and even "Grand Master" Powderly recognize this. It remains to be seen if the Knights are to be guided by temperate counsel.

**Bar Iron.**—Is quiet; nobody is contracting for large amounts that we know of, for there is none offering low enough to tempt speculation. Some of the fancy sizes, Small Hoops and Small Rounds have been offered as low in Pittsburgh in the past 30 days as they have at any time. We do not believe this extends to the general Bar Iron list.

**Sheet Iron.**—There is no change to note in Hoops and Bands. The Sheet-Iron manufacturers declining to book at present prices for May and June delivery. If there is no strike or advance in wages, we hardly look for an improvement in the prices, although they certainly cannot go below what they are at present.

**Steel.**—Tool Steel, while in good demand for contractors and mining purposes, is somewhat demoralized by the presence in the market of inferior grades which are quoted as Best Tool Steel, although they have not yet stood the test of long and critical use. It gives, however, to certain arbitrary buyers an opportunity to indulge in such correspondence as this: "We have been quoted Tool Steel at a lower price (naming some absurd figure); therefore we reduce your invoice to the same." This is irrespective of the quality or brand which may have been sent them, also of the sellers' views on the subject. There seems to be a growing assumption, however, of this privilege which will have to be checked if any seller is to know what his goods are worth or what he is getting for them. This thing of *ex post facto* prices made outside of one's own house after the goods are delivered is becoming too frequent to be pleasant. If the Blair bill passes, a little of the educational fund might be well spent to change people's notions on this point.

**Nails.**—Are in good demand. There is no improvement in prices, and not likely to be any, as more machines are put into operation every week. The demand is about equally distributed between Iron and Steel, without any marked preference for either.

**Wire.**—The effect of the Chicago conference seems to have been to stiffen the market a trifle. It is claimed that some additional backbone was given to the weaker ones by the proposal of the Plain Wire makers to call for cash settlements from those who cut the price.

**General Hardware.**—Is jobbing fairly. Some few of the advances which seemed most likely to hold have been disappointments. On the whole, though, trade is in a healthy condition, and if manufacturers can

afford to sell their goods cheap, we suppose the trade at large will have to bear it, grin or not, as we choose.

## St. Louis.

ROGERS, BROWN & CO., St. Louis, W. H. SHIELDS, manager, report, under date of March 27: It is the general impression that the strike is about at an end. Although not a wheel is turning and business is to a great extent suspended, prices stand firm. There is considerable trading in the territory tributary to this market, and the outlook is better than for some time past. We quote:

Charcoal Foundry.	
Missouri.....	\$17.00 @ \$18.00
Southern.....	18.00 @ 19.50
Coke and Coke Foundry.	
Southern No. 1.....	18.50 @ 18.75
Southern No. 2.....	17.50 @ 17.75
American Scotch.....	18.00 @ 21.00
Mill Iron.	
Missouri.....	16.50 @ 16.75
Southern.....	15.75 @ 16.50
Car-Wheel and Malleable Irons.	
Southern.....	20.00 @ 25.00
Lake Superior.....	21.00 @ 23.50
Scrap, etc.	
Old Wheels.....	15.00 @ 16.25
Old Rails.....	20.00 @ 21.00
Connellsville Coke (East St. Louis).....	5.40

## Detroit.

CHARLES HIMBRO & CO., dealers in Pig Iron, Detroit, Mich., report, under date of March 29, as follows: We are pleased to note that there seems to be a prospect of a speedy settlement of the railroad troubles in the Southwest. The effect of the labor troubles upon business had already been felt here, as some of our Thresher Machine manufacturers throughout the State have had a number of cars returned to them which they were forced to unload. There were also rumors of a strike among the roads centering here that possibly might have led to some labor difficulty on these lines. Our Stove companies, employing probably an aggregate, when running full, of 4500 men, voluntarily raised all of their wages 10%, to take effect on the 1st. We think this will have an excellent effect, having come un solicited. There has been a decided slackness of trade for immediate delivery during the past week, although some future dealings have been made. Prices remain normal; if anything, are inclined to be stiff all along the line. Reports from elsewhere seem to indicate that no large volume of business is being done at this time, and it must of necessity be a period for waiting. We repeat our quotations of a week ago:

Lake Superior Charcoal, all numbers.....	\$21.50 @ \$22.50
Lake Superior Coke, All Ore.....	20.75 @ 21.50
Lake Superior Coke, Cinder Mixed.....	19.00 @ 20.00
Standard Ohio Blackband.....	20.75 @ 21.50
Southern No. 2.....	18.50 @ 19.00
Southern Silvery, Open.....	17.50 @ 18.50
Southern Silvery, Close.....	17.00 @ 18.00
Jackson County, Ohio Silvery.....	19.50 @ 20.00
No. 1 Southern Mill.....	16.50 @ 17.50
American Old Iron Rails.....	22.00 @ 24.00
Old Wheels.....	17.00 @ 19.00

## Coal Market.

The Coal market started up perceptibly on the announcement that the Anthracite producers had substantially agreed upon a basis for future production as to quantity, also to an advance in prices. There is still a fair demand and the market is firm. With the object of perfecting details in the arrangement, all the large Coal companies were represented on Monday at a conference in the Washington Building, in this city, and a full discussion ensued. There were present George B. Roberts, of the Pennsylvania Railroad; Samuel Sloan, of the Delaware, Lackawanna and Western; E. F. Wilbur, of the Lehigh Valley; Joseph D. Harris, of the Lehigh Coal and Navigation; George de B. Keim, of the Philadelphia and Reading; John King, of the Erie; R. M. Olyphant, of the Delaware and Hudson; F. A. Potts, of the New York, Susquehanna and Western, and W. H. Tillinghast, of the Lehigh and Wilkesbarre. It is understood that differences arose respecting the distribution of percentages, which was really the vital point at issue. It may have been conceded, for example, that the Pennsylvania Railway Co. were justly entitled to a larger share than was named in the allotment of one year ago; but who should make the needful concessions? There were but too parts altogether, and it was impossible to make more in the effort to go round. Finally a committee was appointed to arrange a schedule to be submitted at an adjourned meeting in the same place next Monday, the committee to consist of Messrs. King, Roberts, Wilbur and Keim. The common belief among Coal men is that all interests can be harmonized, as failure would be disastrous. It is stated that the new schedule of tolls to be put in effect on April 1 will make a decrease of 10¢ from points of shipment to tidewater, or \$1.50 per ton, against \$1.60 per ton, the present rate.

In the Bituminous trade business is completely blocked by the strike for 10¢ per ton advance in the mining regions. The producers stand firm in their position, excepting in one section of the Clearfield region. Manufacturers in several instances are compelled to close their works for lack of fuel. Among those named are the Columbia Rolling Mill, at Columbia; Seyfell's Rolling Mill, at Reading; the Penn Rolling Mill, at Lancaster; also the puddling department of Williamsport Iron and Nail Works. Deliveries in New York are made only on former contracts. Quotations are about \$4.50. As reported in these columns a week ago, the Berwind-White Co. have already shipped two cargoes of Coal from England and have made considerable contracts contingent upon the future course of the market.

The Delaware and Hudson Canal opens April 5.



# Trade Report.

## General Hardware.

The past week has been an uneventful one in trade, the changes in price being comparatively few and unimportant, and the volume of business showing no material modification. The railroad strikes and the agitation in regard to the labor question, have had somewhat unfavorable effect, inducing a feeling of uncertainty and a lack of confidence. This, it is, however, hoped, will be but temporary. The volume of business for the month has been good. It closes with a fair trade, and the outlook for April is regarded hopefully.

### BARB WIRE.

The market is quiet. The irregularities alluded to in our last report are attributed to occasional sales by Western manufacturers in this market. Eastern manufacturers quote 4½ cents for carload lots, 4½ cents to 5 cents for small lots of Four-Point Galvanized Barb Wire.

### NAILS.

The Nail market continues quiet and featureless, with a moderate demand. We quote Iron Nails, carload lots, on dock, \$2.30 to \$2.35, and same from store, \$2.40 to \$2.45.

### TACKS.

The following Tack manufacturers who have heretofore been in the combination will in future be free from the restrictions under which they have been working, and, in accordance with our recent announcement, will be in the open market to-morrow, April 1:

ABINGTON TACK AND MACHINE ASSOCIATION, Abington, Mass.  
AMERICAN TACK CO., Fairhaven, Mass.  
BAY STATE TACK CO., Sandwich, Mass.  
CHESS, COOK & CO., Pittsburgh, Pa.  
CHICAGO TACK CO., Grand Crossing, Ill.  
CLARK & DOW, Haverhill, Mass.  
COBB & DREW, Plymouth, Mass.  
DUNBAR, HOBART & WHIDDEN, South Abington Station, Mass.  
A. FIELD & SONS, Taunton, Mass.  
D. B. GURNEY, South Abington, Mass.  
JUDSON MFG. CO., Oakland, Cal.  
SAMUEL LORING, Plymouth, Mass.  
NORWAY TACK CO., Wheeling, W. Va.  
PENNSYLVANIA TACK WKS., Norristown, Pa.  
E. PHILLIPS & SONS, So. Hanover, Mass.  
PITTSFIELD TACK CO., Pittsfield, Mass.  
PLYMOUTH MILLS, Plymouth, Mass.  
ROCKFORD TACK CO., Rockford, Ill.  
SANDWICH TACK CO., Sandwich, Mass.  
SHELTON CO., Birmingham, Conn.  
WM. H. SMILEY, Haverhill, Mass.  
STANLEY WORKS, New Britain, Conn.  
STETSON & TALBOT, Holliston, Mass.  
STEVENS & WILLIS, So. Braintree, Mass.  
TAUNTON TACK CO., Taunton, Mass.  
UNION STEEL SCREW CO., Cleveland, Ohio.  
L. C. WATERMAN & SONS, Hanover, Mass.

The following is the official announcement by the Central Mfg. Co. of the termination of the relations of the above manufacturers with the company, their names being those referred to as given on the back of the circular printed below:

### Withdrawal of Prices and Terms of Sale.

APRIL 1st, 1886.

To the Trade: You are hereby notified that the relations which the several manufacturers named on the back of this sheet have heretofore sustained to this company as its agent for the manufacture and sale of goods terminated at the end of the month of March, 1886; that they will be free, on and after April 1, 1886, to accept orders and to sell goods at such prices and on such terms as they may see fit; that such sales will be on their own sole account, and not on account of this company, and that any and all prices, discounts, rebates and terms of sale, general or special, at any time published, quoted or made by this company or its agents for the sale of goods, will not apply to any sales made by them on and after this date, and, as regards any such sales, are hereby expressly revoked and withdrawn. Purchases may be made of our agents named on the back of this sheet, during the month of April, 1886, at our current published prices and terms; but all such prices and terms will cease as above at the end of the month of April, 1886. We thank the trade for their liberal patronage in the past, and solicit a continuance of the same, for all who have been associated with us, in their individual capacity.

Announcing their separation from the Central Mfg. Co., most, if not all, of the manufacturers named above have sent out to the trade the following special circular:

March 31, 1886.

To the Trade: Our relations to the Central Mfg. Co., as its agents for the manufacture and sale of goods, cease with this date, and you are hereby notified that all prices and terms of sale heretofore issued or quoted by us in the name or on account of, or acting as agents of, said company are hereby revoked and withdrawn, as regards all sales made after this date.

We shall be pleased hereafter to quote you prices on our own account. Thanking you for past favors, and soliciting a continuance of the same, we remain, Yours truly,

The following suggestive review of the situation in Tacks will be read with interest, and it will be seen that our correspondents, who occupy a prominent position in the manufacture of this line, take a somewhat more hopeful view of the outlook than is generally entertained:

Jobbers who purchased on the outside bought at the bottom prices last fall. Job-

bers who bought on the inside must have known what these figures were. The July prices of the Central Mfg. Co. brought so many jobbers into line on the inside, that the few who stayed outside could not begin to take the product of the outside makers; hence the outsiders' price got down to the outsiders' cost. The competition between outsiders in August, September and October was as severe as it ever can be again with all the companies competing together. The insiders know that they cannot go below these prices, and believe that at even prices the trade will go to the outsiders. This the jobbers have continually threatened whenever the pool should break. We never take much stock in either threats or promises, and do not think the pool company need to be so scared about the trade coming to the outsiders. The pool companies are in good financial shape, and will not be forced to sell goods below cost because of pecuniary necessity. The majority of the outside companies are likewise in good financial condition, and these elements of financial pressure being obliterated from the Tack business gives it a strength which is overlooked by many. We do not believe that Tacks are going to be slaughtered. We do not intend to throw away the money we have made. We like the color of gold too well for that. We see no reason for alarm among the jobbers. They are posted on last year's prices alluded to and need not expect to buy better than these figures. The leading manufacturers on the outside can manufacture as cheaply as the leading inside manufacturers, and the outside companies are better organized. The outside companies are wide awake; the inside companies have just been aroused from a four years' sleep. From our standpoint we see no reason for alarm among the jobbers or manufacturers. The manufacturers will do a smaller business individually than their capacities and the goods will be sold at cost, but the general demoralization looked for by the jobbers will not be seen. There are no stocks on hand at any of the factories to be slaughtered, and orders will not be taken below cost. Taken altogether the situation is not desperate nor deplorable.

It will be a matter for congratulation if the experience of the next year or two shows that the anticipations generally expressed in regard to the demoralization of the Tack market are unfounded, and if the outcome is not as unsatisfactory to the manufacturers and jobbers as has been anticipated. Another manufacturing concern, writing us, express the hope that the condition of the market will not be found as bad as many have feared. They are at a loss to understand why Tacks should bring only cost or less than cost, when nearly every industry in which Iron or Steel bears a part is experiencing a change for the better. The question, according to their view, resolves itself into one as to the survival of the fittest, when those who have the best facilities and make a high quality of goods will secure the trade. It is, however, obvious that the process by which it is determined which is the fittest, must necessarily be one of close competition and diminished profits to many, if not all, and it would seem unavoidable that some must thereby be driven from the market. With a capacity for the manufacture of three times as many Tacks as the country needs, it is not likely that anything but the most moderate profit will be secured by any manufacturers for some time to come. The breaking of the combination, while inducing much uncertainty in this line and the anticipation of lower prices, is alluded to as having one immediately beneficial effect. The expectation that the combination will sooner or later dissolve has kept the market feverish and unsettled for some months past, and one of the Tack companies express themselves as being glad to see the matter settled one way or the other.

### MISCELLANEOUS PRICES.

Some of the manufacturers of Cast-Iron Shelf Hardware who did not announce advances corresponding to those made by other leading manufacturers are gradually making higher quotations on their goods. The effect of this action is to give greater firmness to prices in this line.

The prices of Shot are a little firmer than they have been, and some well-advised parties are anticipating a further advance before long.

There is some divergence in the prices at which Green Wire Cloth is sold, depending largely on the quality of the goods. The cheaper quality is sold at something like 15 or 20 cents per 100 square feet less than the best goods.

A slight advance has been made in the price at which some low-priced Iron Clothes Wringers have been selling.

The general price of Wire Nails is in most cases firmly maintained, but the figures at which the goods should be regularly sold are sometimes shaded.

The Wire market is characterized by no especially new features, but prices are perhaps a little firmer. The general quotations remain unchanged, but a slight advance has been made in the prices of Wire Clothes Lines.

The manufacturers of Brass Faucets and similar goods have generally withdrawn their quotations, and action has been taken looking toward a revision of list prices, so far as this may be necessary, and the agreement upon and announcement of advanced quotations.

A meeting of the manufacturers of Augers and Bits was held in this city last Thursday and was attended by nearly all the makers. It was not attempted to form an organization, but measures were taken with a view to strengthening the prices on these goods. As the result of the deliberations an ad-

vance of about 10 per cent. was made in the price, and discount 60 and 10 and 5 per cent. determined as the regular quotation.

The market on Carriage Bolts continues in substantially the same condition as it has been in for some time, but prices are perhaps a little firmer, and slightly higher quotations are made by some of the manufacturers.

The Cronk Hanger Co., Elmira, N. Y., for whom John H. Graham & Co. are agents, 113 Chambers street, New York, have changed the list on their 10-inch Cronk Plyers to \$21 per dozen, instead of \$24, as heretofore.

The market for Chisels and Drawing Knives is a little firmer than it has been, and some manufacturers who have been making very low prices are disposed to recede from them.

William Mann, Jr. & Co., Lewistown, Pa., advise us that they have advanced the price of Axes 50 cents per dozen.

Manning, Bowman & Co., Meriden, Conn., and 57 Beekman street, New York, issue a circular, March 25, calling the attention of the trade to the advance of \$1 per dozen in the list of their Nos. 5500 and 8500 series, which goes into effect April 1, and reminding their jobbing friends that this advance must be uniform and positive on the morning of that date. This advance was announced in their circular February 25, in which they explained that in placing their two new series Nos. 5500 and 8500 on the market they did not think the trade would require more costly mounting of the goods than as first made, but they have found it necessary to substitute Planished Brass in place of the metal previously used for Covers, and these Covers are hinged in Solid Brass, joined with Brass Wire. This is referred to as avoiding all risk of corrosion, insuring strength and durability, and permitting a fine finish in nickel-plate. On account of these improvements, which they are now putting into the goods, they have found it necessary to make the slight advance on the list as named above.

### BUCK BROTHERS.

Millbury, Mass., have just issued an appendix to their price list of 1883. The appendix is devoted to Turning Tools for metal, ivory, &c., Amateurs' Wood Turning Tools, Handled; Handled Firmer Chisels, beveled edges; Handled Paring Chisels, beveled edges; Standard Extra Socket Firmer Chisels, beveled edges; Socket Firmer Chisels, beveled edges; Socket Deck Chisels, and the Wood Turners' Sizing Tool. The trade will appreciate having the list prices on these goods. This appendix is issued in style to correspond with Buck Brothers' catalogue of 1883, and gives illustrations and list prices of the different goods to which it refers. The following are the lists for the goods named below, the discount for which is 20 per cent.:

### Turning Tools for Metal, Ivory, &c.

	Per doz.
Square Gravers, ¼, 5-16, ¾, 1, 1½, 2, 2½, 3, 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½, 9, 9½, 10, 10½, 11, 11½, 12, 12½, 13, 13½, 14, 14½, 15, 15½, 16, 16½, 17, 17½, 18, 18½, 19, 19½, 20, 20½, 21, 21½, 22, 22½, 23, 23½, 24, 24½, 25, 25½, 26, 26½, 27, 27½, 28, 28½, 29, 29½, 30, 30½, 31, 31½, 32, 32½, 33, 33½, 34, 34½, 35, 35½, 36, 36½, 37, 37½, 38, 38½, 39, 39½, 40, 40½, 41, 41½, 42, 42½, 43, 43½, 44, 44½, 45, 45½, 46, 46½, 47, 47½, 48, 48½, 49, 49½, 50, 50½, 51, 51½, 52, 52½, 53, 53½, 54, 54½, 55, 55½, 56, 56½, 57, 57½, 58, 58½, 59, 59½, 60, 60½, 61, 61½, 62, 62½, 63, 63½, 64, 64½, 65, 65½, 66, 66½, 67, 67½, 68, 68½, 69, 69½, 70, 70½, 71, 71½, 72, 72½, 73, 73½, 74, 74½, 75, 75½, 76, 76½, 77, 77½, 78, 78½, 79, 79½, 80, 80½, 81, 81½, 82, 82½, 83, 83½, 84, 84½, 85, 85½, 86, 86½, 87, 87½, 88, 88½, 89, 89½, 90, 90½, 91, 91½, 92, 92½, 93, 93½, 94, 94½, 95, 95½, 96, 96½, 97, 97½, 98, 98½, 99, 99½, 100, 100½, 101, 101½, 102, 102½, 103, 103½, 104, 104½, 105, 105½, 106, 106½, 107, 107½, 108, 108½, 109, 109½, 110, 110½, 111, 111½, 112, 112½, 113, 113½, 114, 114½, 115, 115½, 116, 116½, 117, 117½, 118, 118½, 119, 119½, 120, 120½, 121, 121½, 122, 122½, 123, 123½, 124, 124½, 125, 125½, 126, 126½, 127, 127½, 128, 128½, 129, 129½, 130, 130½, 131, 131½, 132, 132½, 133, 133½, 134, 134½, 135, 135½, 136, 136½, 137, 137½, 138, 138½, 139, 139½, 140, 140½, 141, 141½, 142, 142½, 143, 143½, 144, 144½, 145, 145½, 146, 146½, 147, 147½, 148, 148½, 149, 149½, 150, 150½, 151, 151½, 152, 152½, 153, 153½, 154, 154½, 155, 155½, 156, 156½, 157, 157½, 158, 158½, 159, 159½, 160, 160½, 161, 161½, 162, 162½, 163, 163½, 164, 164½, 165, 165½, 166, 166½, 167, 167½, 168, 168½, 169, 169½, 170, 170½, 171, 171½, 172, 172½, 173, 173½, 174, 174½, 175, 175½, 176, 176½, 177, 177½, 178, 178½, 179, 179½, 180, 180½, 181, 181½, 182, 182½, 183, 183½, 184, 184½, 185, 185½, 186, 186½, 187, 187½, 188, 188½, 189, 189½, 190, 190½, 191, 191½, 192, 192½, 193, 193½, 194, 194½, 195, 195½, 196, 196½, 197, 197½, 198, 198½, 199, 199½, 200, 200½, 201, 201½, 202, 202½, 203, 203½, 204, 204½, 205, 205½, 206, 206½, 207, 207½, 208, 208½, 209, 209½, 210, 210½, 211, 211½, 212, 212½, 213, 213½, 214, 214½, 215, 215½, 216, 216½, 217, 217½, 218, 218½, 219, 219½, 220, 220½, 221, 221½, 222, 222½, 223, 223½, 224, 224½, 225, 225½, 226, 226½, 227, 227½, 228, 228½, 229, 229½, 230, 230½, 231, 231½, 232, 232½, 233, 233½, 234, 234½, 235, 235½, 236, 236½, 237, 237½, 238, 238½, 239, 239½, 240, 240½, 241, 241½, 242, 242½, 243, 243½, 244, 244½, 245, 245½, 246, 246½, 247, 247½, 248, 248½, 249, 249½, 250, 250½, 251, 251½, 252, 252½, 253, 253½, 254, 254½, 255, 255½, 256, 256½, 257, 257½, 258, 258½, 259, 259½, 260, 260½, 261, 261½, 262, 262½, 263, 263½, 264, 264½, 265, 265½, 266, 266½, 267, 267½, 268, 268½, 269, 269½, 270, 270½, 271, 271½, 272, 272½, 273, 273½, 274, 274½, 275, 275½, 276, 276½, 277, 277½, 278, 278½, 279, 279½, 280, 280½, 281, 281½, 282, 282½, 283, 283½, 284, 284½, 285, 285½, 286, 286½, 287, 287½, 288, 288½, 289, 289½, 290, 290½, 291, 291½, 292, 292½, 293, 293½, 294, 294½, 295, 295½, 296, 296½, 297, 297½, 298, 298½, 299, 299½, 300, 300½, 301, 301½, 302, 302½, 303, 303½, 304, 304½, 305, 305½, 306, 306½, 307, 307½, 308, 308½, 309, 309½, 310, 310½, 311, 311½, 312, 312½, 313, 313½, 314, 314½, 315, 315½, 316, 316½, 317, 317½, 318, 318½, 319, 319½, 320, 320½, 321, 321½, 322, 322½, 323, 323½, 324, 324½, 325, 325½, 326, 326½, 327, 327½, 328, 328½, 329, 329½, 330, 330½, 331, 331½, 332, 332½, 333, 333½, 334, 334½, 335, 335½, 336, 336½, 337, 337½, 338, 338½, 339, 339½, 340, 340½, 341, 341½, 342, 342½, 343, 343½, 344, 344½, 345, 345½, 346, 346½, 347, 347½, 348, 348½, 349, 349½, 350, 350½, 351, 351½, 352, 352½, 353, 353½, 354, 354½, 355, 355½, 356, 356½, 357, 357½, 358, 358½, 359, 359½, 360, 360½, 361, 361½, 362, 362½, 363, 363½, 364, 364½, 365, 365½, 366, 366½, 367, 367½, 368, 368½, 369, 369½, 370, 370½, 371, 371½, 372, 372½, 373, 373½, 374, 374½, 375, 375½, 376, 376½, 377, 377½, 378, 378½, 379, 379½, 380, 380½, 381, 381½, 382, 382½, 383, 383½, 384, 384½, 385, 385½, 386, 386½, 387, 387½, 388, 388½, 389, 389½, 390, 390½, 391, 391½, 392, 392½, 393, 393½, 394, 394½, 395, 395½, 396, 396½, 397, 397½, 398, 398½, 399, 399½, 400, 400½, 401, 401½, 402, 402½, 403, 403½, 404, 404½, 405, 405½, 406, 406½, 407, 407½, 408, 408½, 409, 409½, 410, 410½, 411, 411½, 412, 412½, 413, 413½, 414, 414½, 415, 415½, 416, 416½, 417, 417½, 418, 418½, 419, 419½, 420, 420½, 421, 421½, 422, 422½, 423, 423½, 424, 424½, 425, 425½, 426, 426½, 427, 427½, 428, 428½, 429, 429½, 430, 430½, 431, 431½, 432, 432½, 433, 433½, 434, 434½, 435, 435½, 436, 436½, 437, 437½, 438, 438½, 439, 439½, 440, 440½, 441, 441½, 442, 442½, 443, 443½, 444, 444½, 445, 445½, 446, 446½, 447, 447½, 448, 448½, 449, 449½, 450, 450½, 451, 451½, 452, 452½, 453, 453½, 454, 454½, 455, 455½, 456, 456½, 457, 457½, 458, 458½, 459, 459½, 460, 460½, 461, 461½, 462, 462½, 463, 463½, 464, 464½, 465, 465½, 466, 466½, 467, 467½, 468, 468½, 469, 469½, 470, 470½, 471, 471½, 472, 472½, 473, 473½, 474, 474½, 475, 475½, 476, 476½, 477, 477½, 478, 478½, 479, 479½, 480, 480½, 481, 481½, 482, 482½, 483, 483½, 484, 484½, 485, 485½, 486, 486½, 487, 487½, 488, 488½, 489, 489½, 490, 490½, 491, 491½, 492, 492½, 493, 493½, 494, 494½, 495, 495½, 496, 496½, 497, 497½, 498, 498½, 499, 499½, 500, 500½, 501, 501½, 502, 502½, 503, 503½, 504, 504½, 505, 505½, 506, 506½, 507, 507½, 508, 508½, 509, 509½, 510, 510½, 511, 511½, 512, 512½, 513, 513½, 514, 514½, 515, 515½, 516, 516½, 517, 517½, 518, 518½, 519, 519½, 520, 520½, 521, 521½, 522, 522½, 523, 523½, 524, 524½, 525, 525½, 526, 526½, 527, 527½, 528, 528½, 529, 529½, 530, 530½, 531, 531½, 532, 532½, 533, 533½, 534, 534½, 535, 535½, 536, 536½, 537, 537½, 538, 538½, 539, 539½, 540, 540½, 541, 541½, 542, 542½, 543, 543½, 544, 544½, 545, 545½, 546, 546½, 547, 547½, 548, 548½, 549, 549½, 550, 550½, 551, 551½, 552, 552½, 553, 553½, 554, 554½, 555, 555½, 556, 556½, 557, 557½, 558, 558½, 559, 559½, 560, 560½, 561, 561½, 562, 562½, 563, 563½, 564, 564½, 565, 565½, 566, 566½, 567, 567½, 568, 568½, 569, 569½, 570, 570½, 571, 571½, 572, 572½, 573, 573½, 574, 574½, 575, 575½, 576, 576½, 577, 577½, 578, 578½, 579, 579½, 580, 580½, 581, 581½, 582, 582½, 583, 583½, 584, 584½, 585, 585½, 586, 586½, 587, 587½, 588, 588½, 589, 589½, 590, 590½, 591, 591½, 592, 592½, 593, 593½, 594, 594½, 595, 595½, 596, 596½, 597, 597½, 598, 598½, 599, 599½, 600, 600½, 601, 601½, 602, 602½, 603, 603½, 604, 604½, 605, 605½, 606, 606½, 607, 607½, 608, 608½, 609, 609½, 610, 610½, 611, 611½, 612, 612½, 613, 613½, 614, 614½, 615, 615½, 616, 616½, 617, 617½, 618, 618½, 619, 619½, 620, 620½, 621, 621½, 622, 622½, 623, 623½, 624, 624½, 625, 625½, 626, 626½, 627, 627½, 628, 628½, 629, 629½, 630, 630½, 631, 631½, 632, 632½, 633, 633½, 634, 634½, 635, 635½, 636, 636½, 637, 637½, 638, 638½, 639, 639½, 640, 640½, 641, 641½, 642, 642½, 643, 643½, 644, 644½, 645, 645½, 646, 646½, 647, 647½, 648, 648½, 649, 649½, 650, 650½, 651, 651½, 652, 652½, 653, 653½, 654, 654½, 655, 655½, 656, 656½, 657, 657½, 658, 658½, 659, 659½, 660, 660½, 661, 661½, 662, 662½, 663, 663½, 664, 664½, 665, 665½, 666, 666½, 667, 667½, 668, 668½, 669, 669½, 670, 670½, 671, 671½, 672, 672½, 673, 673½, 674, 674½, 675, 675½, 676, 676½, 677, 677½, 678, 678½, 679, 679½, 680, 680½, 681, 681½, 682, 682½, 683, 683½, 684, 684½, 685, 685½, 686, 686½, 687, 687½, 688, 688½, 689, 689½, 690, 690½, 691, 691½, 692, 692½, 693, 693½, 694, 694½, 695, 695½, 696, 696½, 697, 697½, 698, 698½, 699, 699½, 700, 700½, 701, 701½, 702, 702½, 703, 703½, 704, 704½, 705, 705½, 706, 706½, 707, 707½, 708, 708½, 709, 709½, 710, 710½, 711, 711½, 712, 712½, 713, 713½, 714, 714½, 715, 715½, 716, 716½, 717, 717½, 718, 718½, 719, 719½, 720, 720½, 721, 721½, 722, 722½, 723, 723½, 724, 724½, 725, 725½, 726, 726½, 727, 727½, 728, 728½, 729, 729½, 730, 730½, 731, 731½, 732, 732½, 733, 733½, 734, 734½, 735, 735½, 736, 736½, 737, 737½, 738, 738½, 739, 739½, 740, 740½, 741, 741½, 742, 742½, 743, 743½, 744, 744½, 745, 745½, 746, 746½, 747, 747½, 748, 748½, 749, 749½, 750, 750½, 751, 751½, 752, 752½, 753, 753½, 754, 754½, 755, 755½, 756, 756½, 757, 757½, 758, 758½, 759, 759½, 760, 760½, 761, 761½, 762, 762½, 763, 763½, 764, 764½, 765, 765½, 766, 766½, 767, 767½, 768, 768½, 769, 769½, 770, 770½, 771, 771½, 772, 772½, 773, 773½, 774, 774½, 775, 775½, 776, 776½, 777, 777½, 778, 778½, 779, 779½, 780, 780½, 781, 781½, 782, 782½, 783, 783½, 784, 784½, 785, 785½, 786, 786½, 787, 787½, 788, 788½, 789, 789½, 790, 790½, 791, 791½, 792, 792½, 793, 793½, 794, 794½, 795, 795½, 796, 796½, 797, 797½, 798, 798½, 799, 799½, 800, 800½, 801, 801½, 802, 802½, 803, 803½, 804, 804½, 805, 805½, 806, 806½, 807, 807½, 808, 808½, 809, 809½, 810, 810½, 811, 811½, 812, 812½, 813, 813½, 814, 814½, 815, 815½, 816, 816½, 817, 817½, 818, 818½, 819, 819½, 820, 820½, 821, 821½, 822, 822½, 823, 823½, 824, 824½, 825, 825½, 826, 826½, 827, 827½, 828, 828½, 829, 829½, 830, 830½, 831, 831½, 832, 832½, 833, 833½, 834, 834½, 835, 835½, 836, 836½, 837, 837½, 838, 838½, 839, 839½, 840, 840½, 841, 841½, 842, 842½, 843, 843½, 844, 844½, 845, 845½, 846, 846½, 847, 847½, 848, 848½, 849, 849½, 850, 850½, 851, 851½, 852, 852½, 853, 853½, 854, 854½, 855, 855½, 856, 856½, 857, 857½, 858, 858½, 859, 859½, 860, 860½, 861, 861½, 862, 862½, 863, 863½, 864, 864½, 865, 865½, 866, 866½, 867, 867½, 868, 868½, 869, 869½, 870, 870½, 871, 871½, 872, 872½, 873, 873½, 874, 874½, 875, 875½, 876, 876½, 877, 877½, 878, 878½, 879, 879½, 880, 880½, 881, 881½, 882, 882½, 883, 883½, 884, 884½, 885, 885½, 886, 886½, 887, 887½, 888, 888½, 889, 889½, 890, 890½, 891, 891½, 892, 892½, 893, 893½, 894, 894½, 895, 895½, 896, 896½, 897, 897½, 898, 898½, 899, 899½, 900, 900½, 901, 901½, 902, 902½, 903, 903½, 904, 904½, 905, 905½, 906, 906½, 907, 907½, 908, 908½, 909, 909½, 910, 910½, 911, 911½, 912, 912½, 913, 913½, 914, 914½, 915, 915½, 916, 916½, 917, 917½, 918, 918½, 919, 919½, 920, 920½, 921, 921½, 922, 922½, 923, 923½, 924, 924½, 925, 925½, 926, 926½, 927, 927½, 928, 928½, 929, 929½, 930, 930½, 931, 931½, 932, 932½, 933, 933½, 934, 934½, 935, 935½, 936, 936½, 937, 937½, 938, 938½, 939, 939½, 940, 940½, 941, 941½, 942, 942½, 943, 943½, 944, 944½, 945, 945½, 946, 946½, 947, 947½, 948, 948½, 949, 949½, 950, 950½, 951, 951½, 952, 952½, 953, 953½, 954, 954½, 955, 955½, 956, 956½, 957, 957½, 958, 958½, 959, 959½, 960, 960½, 961, 961½, 962, 962½, 963, 963½, 964, 964½, 965, 965½, 966, 966½, 967, 967½, 968, 968½, 969, 969½, 970, 970½, 971, 971½, 972, 972½, 973, 973½, 974, 974½, 975, 975½, 976, 976½, 977, 977½, 978, 978½, 979, 979½, 980, 980½, 981, 981½, 982, 982½, 983, 983½, 984, 984½, 985, 985½, 986, 986½, 987, 987½, 988, 988½, 989, 989½, 990, 990½, 991, 991½, 992, 992½, 993, 993½, 994, 994½, 995, 995½, 996, 996½, 997, 997½, 998, 998½, 999, 999½, 1000, 1000½, 1001, 1001½, 1002, 1002½, 1003, 1003½, 1004, 1004½, 1005, 1005½, 1006, 1006½, 1007, 1007½, 1008, 1008½, 1009, 1009½, 1010, 1010½, 1011, 1011½, 1012, 1012½, 1013, 1013½, 1014, 1014½, 1015, 1015½, 1016, 1016½, 1017, 1017½, 1018, 1018½, 1019, 1019½, 1020, 1020½, 1021, 1021½, 1022, 1022½, 1023, 1023½, 1024, 1024½, 1025, 1025½, 1026, 1026½, 1027, 1027½, 1028, 1028½, 1029, 1029½, 1030, 1030½, 1031, 1031½, 1032, 1032½, 1033, 1033½, 1034, 1034½, 1035, 1035½, 1036, 1036½, 1037, 1037½, 1038, 1038½, 1039, 1039½, 1040, 1040½, 1041, 1041½, 1042, 1042½, 1043, 1043½, 1044, 1044½, 1045, 1045½, 1046, 1046½, 1047, 1047½, 1048, 1048½, 1049, 1049½, 1050, 1050½, 1051, 1051½, 1052, 1052½, 1053, 1053½, 1054, 1054½, 1055, 1055½, 1056, 1056½, 1057, 1057½, 1058, 1058½, 1059, 1059½, 1060, 1060½, 1061, 1061½, 1062, 1062½, 1063, 1063½, 1064, 1064½, 1065, 1065½, 1066, 1066½, 1067, 1067½, 1068, 1068½, 1069, 1069½, 1070, 1070½, 1071, 1071½, 1072, 1072½, 1073, 1073½, 1074, 1074½, 1075, 1075½, 1076, 1076½, 1077, 1077½, 1078, 1078½, 1079, 1079½, 1080, 1080½, 1081, 1081½, 1082, 1082½, 1083, 1083½, 1084, 1084½, 1085, 1085½, 1086, 1086½, 1087, 1087½, 1088, 1088½, 1089, 1089½, 1090, 1090½, 1091, 1091½, 1092, 1092½, 1093, 1093½, 1094, 1094½, 1095, 1095½, 1096, 1096½, 1097, 1097½, 1098, 1098½, 1099, 1099½, 1100, 1100½, 1101, 1101½, 1102, 1102½, 1103, 1103½, 1104, 1104½, 1105, 1105½, 1106, 1106½, 1107, 1107½, 1108, 1108½, 1109, 1109½, 1110, 1110½, 1111, 1111½, 1112, 1112½, 1113, 1113½, 1114, 1114½, 1115, 1115½, 1116, 1116½, 1117, 1117½, 1118, 1118½, 1119, 1119½, 1120, 1120½,	



other sizes up to 1/4 inch inclusive are made from P. S. Stubs' Steel, and all sizes above 1/4 inch from Thomas Firth & Sons' Steel. The company's factory is located in the buildings formerly occupied by the Foundry and Machine Co., 34 Court street.

Pope & Stevens, 114 Chambers street, New York, issue a revised catalogue representing the line of Dog Collars, Muzzles, Roller Skates, Skate Straps, &c., which they are offering to the trade. With the increasing demand for Dog Collars and the constant changes in style, they represent many new patterns in connection with the standard styles with which the trade are familiar. Attention is also called to the fact that they still continue to carry in stock Barney & Berry's Skates and C. S. Osborne & Co.'s goods. They allude also to their increased facilities for the manufacture of Dog Furnishings, to their large assortment of which they are constantly adding new styles. Their new Basket Stand for displaying Dog Collars is shown in their announcement on page 46.

Matthai, Ingram & Co., Baltimore, Md., issue a new catalogue of the goods of their manufacture. It is divided into five sections which are devoted respectively to Patent Piece Ware, Plain and Retinned Stamped Ware, Shallow Stamped Ware, Tinners' Trimmings and Japanned Ware. In their introductory circular they refer to the fact that they are the originators and patentees of the patent bottom Piece Ware, now so widely known, and allude also to having improved machinery and excellent facilities for producing this class of goods. They call attention to their system of packing and nesting as advantageous in securing low freight rates and saving time and labor in handling, making a point also in regard to the low freights from Baltimore to the South and West.

By an error in our last issue, C. F. Weaver & Son were spoken of as at Buffalo, N. Y., their location being, as our readers inferred from the remainder of the paragraph, at Rochester.

The Chicago Tack Co., Grand Crossing, Ill., in a circular dated April 1, announced that they have dissolved their connection with the Tack manufacturers, and are prepared to quote prices and make contracts on their own account. Besides alluding to the quality of their goods they mention an increase in their facilities for manufacture, and call the attention of the Western trade to the advantages of their location as enabling them to furnish goods without the expense of transportation from the East.

The striking two-page advertisement of the Manhattan Hardware Co., Reading, Pa., will attract the attention of our readers, giving, as it does, their revised quotations April 1, and referring to their method of conducting their business.

The E. C. Meacham Arms Co., St. Louis, Mo., issue their price list No. 344, March 22, in which is represented a large line of Guns, Sporting Goods, Fishing Tackle, Angling Implements and many specialties. It is accompanied by a discount sheet in the company's well-known form.

Our readers will observe the advertisement on page 40, in which L. Hensheim, 16 and 18 Exchange place, New York, offers a Wire Nail Machine manufactured by Malmédie & Hiby, Dusseldorf-Oberbilk, Germany. An illustration of the machine is given, and the announcement will be of interest to some of our readers.

The past week has been an exceptionally heavy one in its importations of Hardware and Cutlery, which are reported to be the largest of any week for a long time.

J. Gildersleeve has resumed his connection with the Lamson & Goodnow Mfg. Co., Shelburne Falls, Mass., and 88 Chambers street, New York, and will represent them in the West, as heretofore.

John Campbell, Manchester, N. H., issues new circulars relating to his Eureka Clothes Dryer, Giant Store Truck, and Wood Hitching Posts with galvanized or japanned iron cap.

In regard to the recent cartons decision of the Supreme Court in the Obersteuffer case, which has been regarded with much interest by importers, Collector Hedden has received orders from Washington to permit importers to deduct the value of cartons and inner coverings from importations whenever the value of such covering is specified in either the invoice or the entries, separate from the value of the goods. The order, it will be perceived, gives the merchants some latitude, as it states that specification in the entry alone is sufficient. This whole matter, as importers understand it, is one of much more importance in other lines than it is in Hardware, in which branch of importation the cost of the coverings is an exceedingly insignificant item. In the meantime some uncertainty has been caused in the minds of importers by the recent instructions from the Treasury Department to Collector Hedden, by which the effect of the decision in regard to cartons is limited to coverings of goods in plurality, such as hosiery, gloves, laces, &c., where the coverings do not pass into the hands of consumers, but simply serve as temporary protection for goods, and which thus come clearly within the purview of the decision; but it is directed, in reference to the boxes of blacking, matches, pre-

served fruit, &c., cases containing pipes, opera glasses, musical instruments, &c., that duty should be assessed as heretofore, leaving importers the privilege of raising the question by protest and appeal.

Our readers will observe the announcement occupying page 43 which the Russia Cement Co., Gloucester, Mass., make to the trade concerning La Page's Glue. The company have recently put up the Glue in a neat tin package, which in a wooden case is suitable for transmission through the mails.

The Miller Lock Co., Philadelphia, Pa., issue their catalogue No. 6, representing their line of Champion Locks, with a full description of their special features. The pamphlet embodies their most recent additions, and will serve the convenience of the trade.

The trade will observe the announcement made by the Walkley Hardware Co., Plantsville, Conn., and 27 Chambers street, New York, in regard to their line of Tacks, Brads, &c. As leading manufacturers of these goods, to the quality of which they call special attention, their announcement, in the present condition of the market, will be received with interest by our readers.

Whitney, Cordier & Co., 101 Chambers street, New York, with factory at Winchendon, Mass., issue their first catalogue, dated March 15. It represents the Alpine Air Gun, Brooke's Patent Combination Padlock, a line of Braces, Furbush's Patent Ratchet Screw-Driver, and other specialties, which are described, and list prices given. The pamphlet is attractively printed and will be received by the trade with interest.

The Ross & Fuller Association are now removing from their present location, 97 Chambers and 79 Reade streets, to the more spacious premises 33 Chambers street, where they will have ample room to show goods.

The Isaac Walker Hardware Co., Peoria, Ill., issue a price current relating to such seasonable lines as Forks, Hoes, Rakes, Cradles, Scythes, Lawn Mowers, Shovels and Spades, Wheelbarrows, Clevises, Refrigerators and a variety of other goods.

The Concord Axle Co., Fisherville, now Penacook, N. H., issue their catalogue for the current year, a convenient, well-printed pamphlet describing the original Concord Axles and other goods of their manufacture. It is accompanied by a circular which calls attention to the Dexter Horse Hook, the object of which is to remove snow, ice and gravel from horses' feet.

JOHN CAMPBELL, Manchester, N. H., manufacturer of Stable Furniture, Hitching Posts, and Hitching Post Caps and other specialties, is offering these goods at the prices given below. The Stable Furniture, Eureka Clothes Dryer, Harness Pins, &c., described in the following list are subject to a discount of 40 and 10 per cent., with an additional discount for cash in 10 days of 2 per cent.:

Each.	Per doz.
Corner Manger, No. 25, Full Front and Corner Food Guard.....	\$2.30
Corner Manger, No. 26, Full Corner Food Guard.....	2.35
Cast Iron Stall Collar, No. 80, length, 3 ft. 2 in.; width, 1 ft. 10 in.....	1.80
Cast Iron Corner Hay Rack, No. 81.....	2.30
Corner Hay Rack, Cast Iron Top and Bottom, with Wrought Iron Rods, No. 82.....	3.50
Eureka Clothes Dryer, No. 74.....	1.00
Wood Harness Pins.....	
No. 90, length 9 in., Gal'd Base, Brass Tip.....	\$1.80
No. 91, length 7 1/2 in., Gal'd Base, Brass Tip.....	1.70
No. 92, length 6 in., Gal'd Base, Brass Tip.....	1.50
No. 93, length 9 in., Jap'd Base, Brass Tip.....	1.40
No. 94, length 7 1/2 in., Jap'd Base, Brass Tip.....	1.30
No. 95, length 6 in., Jap'd Base, Brass Tip.....	1.10

The following are the list prices of Wood Hitching Posts, and Hitching Post Caps, the discount being 40 per cent., with an additional 2 per cent. for cash in 10 days:

Each.	Per doz.
Horse Head Cap, A, Japanned.....	\$2.25
Horse Head Cap, A, Galvanized.....	3.75
Horse Head Cap, E, Japanned.....	1.15
Horse Head Cap, E, Galvanized.....	1.80
Acorn Cap, B, Japanned.....	1.00
Acorn Cap, B, Galvanized.....	1.50
Ball Cap, C, Japanned.....	1.00
Ball Cap, C, Galvanized.....	1.50
Ball Cap, D, Japanned.....	1.15
Ball Cap, D, Galvanized.....	1.65
Ball Cap, I, Japanned.....	.85
Ball Cap, I, Galvanized.....	.90
Round Cap, G, Japanned.....	.90
Round Cap, G, Galvanized.....	.90
Round Cap, H, Japanned.....	.45
Round Cap, H, Galvanized.....	.45
Round Fluted Cap, M, Japanned.....	.85
Round Fluted Cap, M, Galvanized.....	.85
Fox Head Hitching Ring, No. 60, Japanned.....	.90
Fox Head Hitching Ring, No. 60, Galvanized.....	.90
Cross Hitching Ring, No. 61, Japanned.....	.90
Cross Hitching Ring, No. 61, Galvanized.....	.90
Horse Shoe Hitching Ring, No. 62, Japanned.....	.45
Horse Shoe Hitching Ring, No. 62, Galvanized.....	.45
Galvanized Iron or Zinc Cover, No. 4, Zinc.....	.40
Galvanized Iron or Zinc Cover, No. 4, Galvanized Iron.....	.60
Galvanized Iron or Zinc Cover, No. 9, Zinc.....	.40
Galvanized Iron or Zinc Cover, No. 9, Galvanized Iron.....	.60
Horse Ornament, No. 71, Japanned.....	.80
Horse Ornament, No. 71, Galvanized.....	.45

Each.	Per doz.
Wood Hitching Posts.....	
No. 1 A, Round, Galvanized Cap.....	\$5.70
Japanned Cap.....	4.30
No. 1 A, Squared, Galvanized Cap.....	6.00
Japanned Cap.....	4.20
Galvanized Cap and Hitch Rings.....	6.90
Japanned Cap and Hitch Rings.....	5.10
Galvanized Cap Hitch Rings and Ornaments.....	7.80
Japanned Cap, Hitch Rings and Ornaments.....	5.70
No. 5 E, Galvanized Cap.....	2.30
Japanned Cap.....	2.50
No. 4 D, Galvanized Cap and Galvanized Cover.....	3.60
Japanned Cap and Galvanized Cover.....	3.10
No. 9 I, Galvanized Cap and Galvanized Cover.....	2.85
Japanned Cap and Galvanized Cover.....	2.75
No. 2 B, Galvanized Cap.....	2.25
No. 3 B, Japanned Cap.....	2.25
No. 8 C, Galvanized Cap.....	2.75
No. 8 C, Japanned Cap.....	2.25
No. 8 H, Galvanized Cap.....	2.30
No. 8 H, Japanned Cap.....	2.00
No. 12 M, Galvanized Cap.....	2.00
No. 12 M, Japanned Cap.....	1.80

#### ARRANGEMENT OF HARDWARE STORES.

We give below illustrations explaining the arrangement and construction of an Iron Rack, for which we are indebted to a Hardware house in the South. Fig. 53 represents the general appearance of the Rack, and Fig. 54 gives some of the details of its construction. It will be seen that the Iron rests on

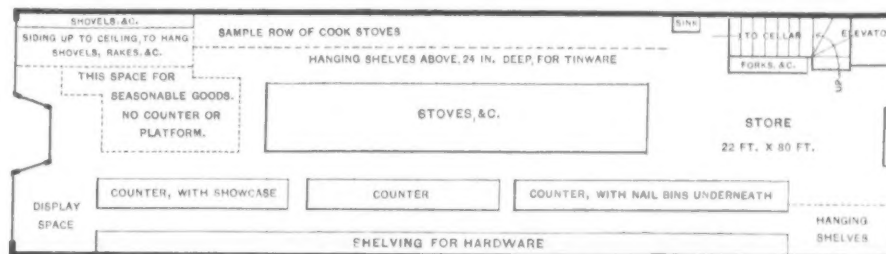


Fig. 53.—Arrangement of "Retailer's" Store.

a low platform, with a strip near the front to keep the bars in place. For this platform or base a plank 2 x 24 inches is recommended. Its special object is to keep dust and dirt away from the Iron. Fig. 54 represents the manner of constructing the upper

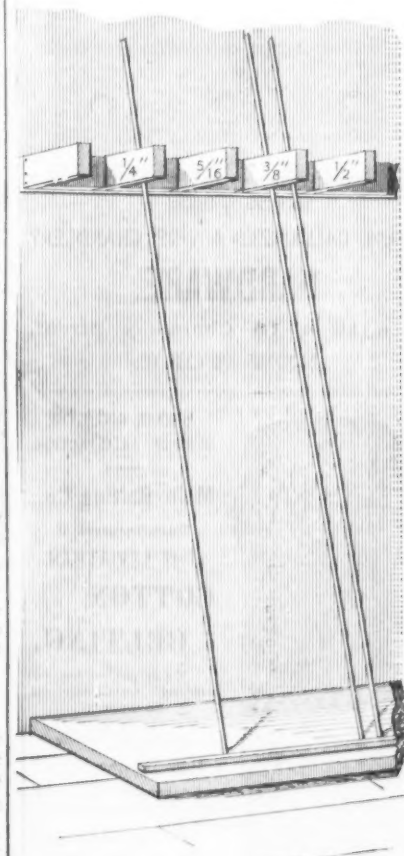


Fig. 54.—Details of Iron Rack.

portion of the Rack. C is a plank 6 inches wide and 1 1/2 inches thick, of required length, nailed to the wall. B B are pieces of 1 1/2 inch stuff cut to length of division required, nailed to the wall plank, and thus ready to receive the division blocks A A.

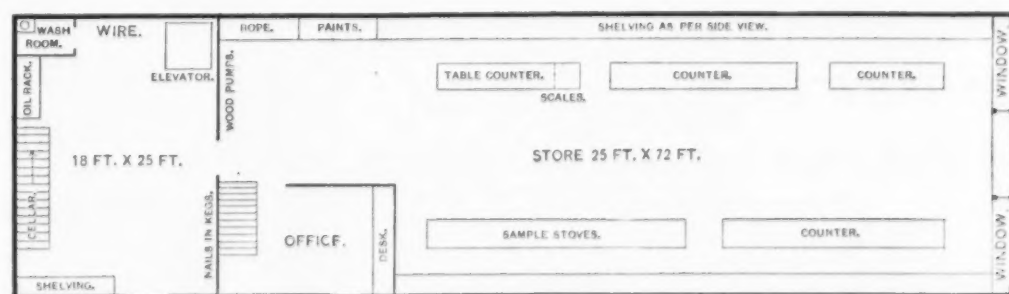


Fig. 55.—R. Kennedy & Son's Store.

A A are blocks of wood cut 6 inches wide and 1 1/2 inches thick, and 12 inches long, which are fastened to B and C, as indicated at D. They are to be painted white, and the size of Iron lettered in black.

In connection with the following description of the arrangement of R. Kennedy & Son's Hardware store, Willoughby Ohio, we give two diagrams—one, Fig. 55, show-

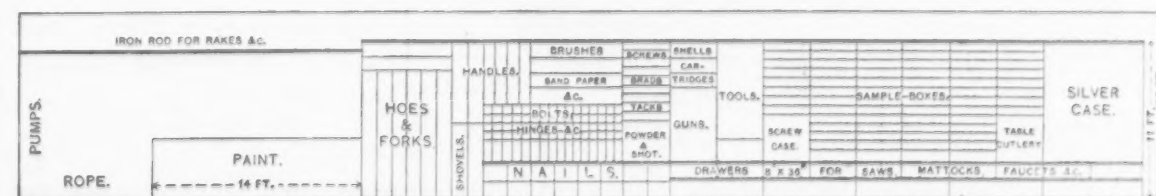


Fig. 56.—Arrangement of Shelving.

ing the manner in which the floor space is utilized, and another, Fig. 56, the use that is made of one of the side walls, with other details of arrangement:

Our store is 25 x 90 feet, with 13 feet ceiling, and a partition 72 feet front, which gives a salesroom of 25 x 72, and backroom 18 x 25 on first floor. Being a corner store it has plenty of light. It is shelved and furnished to accommodate our line of goods, viz., General Hardware, Stoves, Tinware and House-Furnishing Goods. Our shelving is

11 feet high, 12 inches deep. On one side in front is a wall case, trimmed with black velvet for Plated Silver, which shows to advantage. Next come Hardware sample boxes. All spaces for boxes are 6 x 36 inches. Boxes are 4 x 6, 6 x 6, 9 x 6, 12 x 6 and 18 x 6 inches, and are thus all interchangeable in the spaces. We like sample boxes to keep Hardware in much better than original packages, as they are more conven-

able undertaking which will be of service in enabling Hardwaremen to make their stores look as they should, instead of being like junk shops, as he intimates most of them are, gives the following brief description of his store, which is 22 x 80 feet, and represented in the accompanying diagram.

I inclose a sketch of my store, Fig. 57, which, I think, is very convenient. I do not

handle wood or iron stock, so have made no provision for them. My hanging shelves on the left, shown in Fig. 58, are 24 inches deep, and leave a space under them of 5 feet, in which Stoves are placed. I have all Stoves on wooden platforms with casters, using no stationary platforms at all, so that I can arrange my goods to the best effect. I use no sample boxes, believing them more trouble than profitable. Keep Stoves in original packages. I always find them in the right place, and never go to a case and find I have none in it, and have to stop and fill up while a customer is waiting. I keep Strap and T Hinges in bins behind the Nail counter, having all the rough goods together. Bolts are behind the same counter. The top

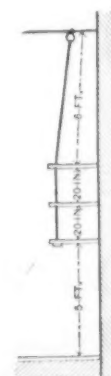


Fig. 58.—Hanging Shelves.

of shelving on the right hand is wide, so that a great many light goods can be put there. This is only a little retail store, but is an improvement on some I know. RETAILER.

In reply to the inquiries which appeared in our issue of the 4th inst., a correspondent expresses the following views:

1. That the best plan for Glass Rack, to carry Glass ranging from 8 x 10 to 12 x 36, is to have the Rack 12 inches wide and about 7 feet high, the length depending upon the space in which it is to be put and the stock of Glass to be carried.
2. That the best method to keep Hollow-Ware is to have it in bins under the counter, and to sample the Pots, &c., by hanging in a row under the projection of the counter.
3. Files may be most advantageously kept in a case or ledge 16 inches deep at bottom, running back to 4 inches deep at

top, divided into bins large enough to take a package or box of Files. Horse Raps may thus be kept with the Files.

The production of the diamond mines in South Africa in 1885 was 2,440,788 karats, the weekly output fluctuating between 145,195 in June and 261,912 karats in December. In 1883 the yield was 2,263,686 karats and 2,263,686 karats in 1883. The output of the

principal mines in 1885 was as follows: Kimberly, 523,774 karats; De Beer, 565,234; Dutoits pan, 560,913, and Bulfontein 636,340 karats.

Since the enactment of the German Patent law late in 1877, the Patent Office has granted 34,561 patents, of which number 163 were subsequently declared void, and 23,365 expired for non-payment of dues, leaving only 11,036 in force. The German Patent Office is self-sustaining.



**L. COES'**  
GENUINE IMPROVED  
**Knife Handle**  
PATENT  
**Screw Wrenches**  
MANUFACTURED BY  
**L. COES & CO.,**  
Worcester, Mass.  
ESTABLISHED IN 1839.




Patented July 6, 1880. Patented July 8, 1884.  
Registered March 31, 1874.

Sectional view illustrates our NEW KNIFE HANDLE, showing Malleable Iron Frame and Shank of Bar keyed into position.  
Straight Bar, Extra LONG NUT FOR SCREW IN JAW.

The Best Made and Strongest Wrench in the Market.  
Send for Illustrated Price List and Circular.

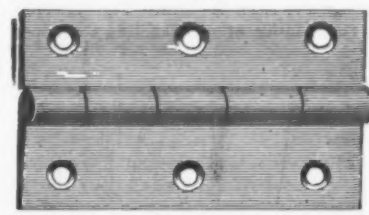
**J. C. McCARTY & CO.,**  
NEW YORK,  
Sole Agents.

**A. E. DEITZ.**



No. 51 Lock.

**J. C. McCARTY & CO., Agents,**  
97 Chambers and 81 Reade Sts.,  
NEW YORK.



**W. & J. TIEBOUT,**  
MANUFACTURERS OF  
BRASS, GALVANIZED & SHIP CHANDLERY  
**HARDWARE.**  
Nos. 16 & 18 Chambers Street,  
NEW YORK.

**ALWAYS GIVES THE  
UTMOST SATISFACTION.**

**Main Belting Co.,**  
Manufacturers of  
**THE LEVIATHAN  
COTTON  
BELTING.**

Unsurpassed for  
Strength, Durability and  
Cheapness.  
Made to any Length,  
Width and Strength.  
**Main Driving Belts.**  
Guaranteed to Run  
Straight, Even Through-  
out.  
No Cross Joints, Un-  
affected by Damp.  
Clings well to the Pulley,  
Has no equal. In fact,  
is THE BELT.

**MAIN BELTING  
COMPANY,**  
S. W. cor. Ninth and Reed  
Sts., Philadelphia.  
Also  
248 East Randolph St.,  
CHICAGO.

**EXPANDING  
TAPS**



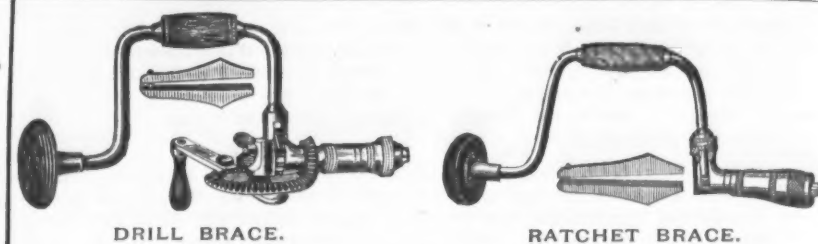
From 3-4 in. to 10  
in. Wrought-Iron  
Pipe Size.  
SEND FOR PRICES.

**WORSWICK MFG. CO.,**  
CLEVELAND, O.,  
Manufacturers of  
Malleable and Cast Iron Fittings and  
Brass Goods.  
Jobbers of  
Plumbers', Gas and Steam Fitters'  
Tools and Supplies.  
Agents for  
IRON PIPE AND BOILER TUBES.  
SEND FOR CATALOGUE.

USE THE **Mason**  
**Pressure Regulator**  
FOR STEAM PUMPS

USE THE **Mason**  
**Speed Governor**  
FOR STEAM PUMPS.

**THE MASON REGULATOR CO.,**  
Manufacturers of Steam Traps, Pressure Regulators  
and Speed Governors for Steam Pumps, Damper Reg-  
ulators and Reducing Valves.  
22 Central St., Boston, 115 Liberty St., New York



During the year 1885 many new styles of Bit Braces were put on the market, and many old styles were much reduced in quality and price. In face of it all we made our Braces a little better than ever before, and kept our prices steady.

We felt certain that good workmen would buy good tools, and that they would find them in some place. The result bore out our anticipations. Though business generally was not remarkably good, we found at the end of the year that our Brace sales had been larger than ever before.

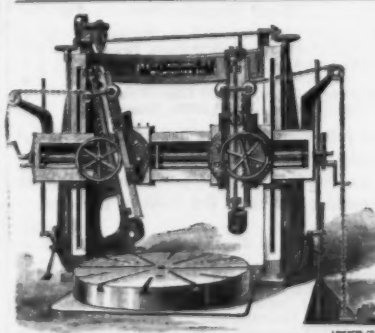
For the year to come we will make still better goods, sell them at a reasonable price, and trust that our friends, the Dealers, will put them within the reach of all who want them at such prices.

**MILLERS FALLS CO.**  
74 CHAMBERS STREET,  
NEW YORK.

**CHAMPLAIN**  
Forged Horse Nails.  
MANUFACTURED BY THE  
**NATIONAL HORSE NAIL CO.,**  
Vergennes, Vermont.  
HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST  
NORWAY IRON AND WARRANTED.  
WAREHOUSE  
97 CHAMBERS AND 81 READE STREETS NEW YORK.  
**J. C. McCARTY & CO. Sole Agents.**

**H. B. SEIDEL,** President. **W. HASTINGS,** Vice-Pres. and Gen'l Mgr. **E. T. CANBY,** Sec. and Treas.  
**THE SEIDEL & HASTINGS CO.**  
WILMINGTON, DELAWARE,  
New York Office, No. 221 Pearl, Corner Platt Street,  
MANUFACTURERS OF  
**BEST CHARCOAL  
BOILER PLATES,**  
AND PLATE IRON GENERALLY.  
ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our C. H. No. 1 Boiler Plates, which we manufacture expressly for the Shells of Steam Boilers and stamp 50,000 pounds T. S. when desired. One hundred and sixteen tests of this iron, made during the last three years by the U. S. Inspectors of Steam Vessels, show an average tensile strength of 52,508 pounds to the sectional square inch, and an average reduction of area of the fractured section of 30% per centum. Our prices are as low as the production of a good article will admit of.



**BETTS MACHINE CO.,**  
WILMINGTON, DEL.,  
MAKERS OF  
Improved Machine Tools.

**BORING AND TURNING MILLS**  
Of Modern Design and First-class Workmanship.  
Sizes up to 14 feet Swing.

**STRONGEST ACME WRENCH AND BEST**

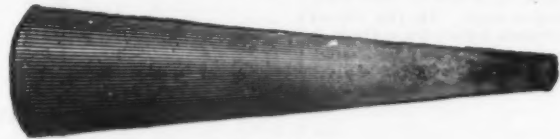


**ILLINOIS IRON & BOLT CO.,**

Nos. 20 to 26 Main Street,  
CARPENTERSVILLE, KANE CO., ILL.

MANUFACTURERS OF

**BLACKSMITH CONES OR MANDRELS.**



CAST IRON.

No. 1, 32 in. high, 8 in. wide at base, weight about	56 lbs.
" 2, 48 " " 12 " " " "	115 "
" 3, 52 " " 14 " " " "	140 "
" 4, 54 " " 15 " " " "	200 "

**BLACKSMITHS' TOOLS, JACK SCREWS,**

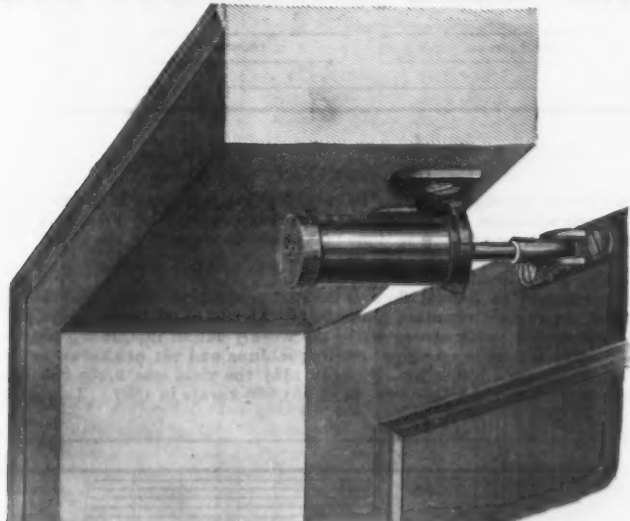
Track Jacks, Carriage Makers' Vises,

THIMBLE SKEINS, SADIRONS,

COPYING PRESSES AND STANDS, &c.

**WATTS • MANUFACTURING • CO.,**  
480 PEARL STREET, NEW YORK  
SOLE MANUFACTURERS OF THE

**WATTS PNEUMATIC DOOR CHECK.**



The Latest Improved, Most Simple and Only Reliable Door Check  
Now on the Market.

It can be applied to either side of the Door or on the casing overhead. In fact, the only universal Air Door Check made that can be sold over the counter, not requiring an expert to put it on. Can be applied by anybody, and are sold at a less price than other Checks. Catalogues and Price Lists furnished on application.

**E. MERRITT & CO.**  
ESTABLISHED 1859 — BROCKTON, MASS.  
The Only Manufacturers of a Complete Line of  
**TACK AND NAIL MACHINERY.**  
SEND FOR CIRCULAR — UPRIGHT DRILLS.

**PURE TURKISH EMERY.**  
**WALPOLE EMERY MILLS,**  
South Walpole, Mass.



MI. IRON, CASE,	1	10	W. WHEELS	04	3	400
-----------------	---	----	-----------	----	---	-----



## Current Hardware Prices, March 31, 1886.

## HARDWARE.

### Ammunition.

[illegible]

### Bit Holders.

[illegible]

**Cartridges.**—See Ammunition.

[illegible]

### Faucets.

[illegible]

**Half Hatch**

Broad Hatchets, No. 1, 4-in. cut..... 10.50  
Broad Hatchets, No. 2, 4½-in. cut..... 11.50  
Broad Hatchets, No. 3, 5-in. cut..... 13.00  
Broad Hatchets, No. 4, 5½-in. cut..... 14.50  
Broad Hatchets, No. 5, 6-in. cut..... 16.00  
Broad Hatchets, No. 6, 6½-in. cut..... 18.00  
Isalsh Hunk..... do 35 @ 40  
Hunt's Shingling Lath and Claw..... do 40 & 45  
Hurd's..... do 40 & 45  
Verkes & Plumb..... do 40 & 100 @ 100 & 125  
Hurd's Broad Tool Co..... do 40 & 100 @ 100 & 125  
C. Hammond & Son..... do 40 & 100 @ 100 & 125  
Simmons..... do 35 @ 40  
Kelly's..... do 40 & 100 @ 100 & 125  
Ten York Edge Tool Co..... do 40 & 100 @ 100 & 125  
Shingling..... do 40 & 100 @ 100 & 125  
Lath, Nos. 123..... do 60 65 70 75 80 85 90 95 100  
Lath, Nos. 123..... do 50 55 60 65 70 75 80 85 90 95 100  
"Lightning"..... do 13.50 @ \$14 net  
Gem..... do 10 @ 12  
Wadsworth's..... do 13.50  
Hoath Patent..... do 13 @ 13.50  
Bradfield..... do 18, do 10 & 10 @ 10  
Hinges—  
Wrought Iron Hinges—  
Strap and T..... do 60 & 65  
Strap..... do 14 to 38 in. b..... 34 & 40  
Heavy Welded Hook..... 8 to 12 in. b..... 34 & 40  
Screw Hook and Eye..... 14 in. & up, b..... 24 & 30  
Rolled Blind Hinges, Nos. 32 and 33..... do 83.90  
Rolled Blind Hinges, Nos. 32 and 33..... do 58.10  
Rolled Raisers..... do 70 & 75  
Plate Hinges 8, 10 and 12 in. b..... 45 & 50  
Spring Hinges..... do 12 in. b..... 35  
Geer's Springs and Blank Butts..... do 10 to 50  
Union Spring Hinge Co..... do 30  
American Spring Hinge Co..... do 30  
Geer Spring Hinges..... do 30  
Barker's Double Acting..... do 20 & 10  
Bommer's..... do 32  
Buckman's..... do 25  
Acme..... do 60 & 100  
Climax..... do 50 & 10  
Tange..... do 30 @ 30 & 10  
Western..... do 44.40, do 55  
N. E..... do 70, do 85  
Clark's, Nos. 123..... do 60 & 125  
Automotive..... do 85.00, do 55  
Common Sense..... do 12.50, do 50  
Reynolds..... do 40 & 10  
Shepard's, No. 3..... do 10 & 20  
Reed's Latch and Hinges..... do 12, do 50  
Garden, Mortar, &c..... do 10 & 10 @ 10 & 10  
Warren Hoe..... do 10 & 10 @ 10 & 10  
Magic..... do 40 & 10  
H. & Scoville..... do 15 & 15  
Lane & Gale..... do 50 @ 50 & 10  
Sargent, Sargent & Co..... do 90 @ 60 & 5  
Hubbard & Bakewell..... do 10 & 10 @ 10 & 10  
Iron..... do 10 & 10 @ 10 & 10  
Hill's Improved Ringers..... do 40, 60  
Hill's Old Style Ringers..... do 40, 60  
Hill's Ringers..... do 40, 60  
Perfect Ringers..... do 40 boxes  
Fair Hoe Ringers..... do 40  
Hoisting Apparatus—  
Moore's Hand Hoist, with Lock Brake..... do 15  
Hoisting Apparatus, Essential Fly Block..... do 20  
Hollow-Ware—  
Hollow-Ware, Ground..... do 50 & 50 @ 10  
Hollow-Ware, Unground..... do 50 & 10 @ 10 & 10  
Oval Rollers, Saucepans and Glue Pots..... do 50 & 10  
Oval Rollers, Saucepans and Glue Pots..... do 40 @ 40 & 5  
Cast and Granite Ware..... do 40 @ 40 & 5  
Saucer Hollow-Ware..... do 40 @ 40 & 5  
Aluminum Tea-Kettles..... do 40 @ 40 & 5  
Inch..... do 40 @ 40 & 5  
Rach..... do 40 @ 40 & 5  
Hollow-Ware—  
Bird Cage, Sargent's lat..... do 40 & 10 @ 10  
Bird Cage, Reading..... do 40 & 10 @ 10  
Clothes Line, Reading lat..... do 40 @ 40 & 10  
Ceiling, Sargent's lat..... do 40 @ 40 & 10  
Coat and Hat, Sargent's..... do 40 @ 40 & 10  
Coat and Hat, Reading..... do 40 @ 40 & 10  
Iron..... do 40 @ 40 & 10  
Dutton Pat. N. Y. Mallet & Hand W..... do 1.25  
Fassel and Picture (T. & S. Mfr. Co.)..... do 50  
Hench Hooks..... See Wrought Goods  
Fire—  
Wire Coat and Hat, Gem..... do 45  
Wire Coat and Hat, Miles..... do 70  
Wire Screw Hooks and Eyes..... do 25  
Sh..... do 25  
Fire-Patent..... do 25  
Hooks and Eyes—Brass..... do 40  
Hooks, American..... do 40 & 10  
Lorse Nail..... do 40 & 10  
Nails—  
No. 6 7 8 9 10  
No. 6..... 31¢ 24¢ 21¢ 19¢ 17¢..... do 25 & 10  
No. 7..... 24¢ 21¢ 19¢ 17¢..... do 25 & 10  
No. 8..... 21¢ 19¢ 17¢ 15¢..... do 25 & 10  
No. 9..... 19¢ 17¢ 15¢ 13¢..... do 25 & 10  
No. 10..... 17¢ 15¢ 13¢ 11¢..... do 25 & 10  
No. 11..... 15¢ 13¢ 11¢ 9¢..... do 25 & 10  
No. 12..... 13¢ 11¢ 9¢ 7¢..... do 25 & 10  
No. 13..... 11¢ 9¢ 7¢ 5¢..... do 25 & 10  
No. 14..... 9¢ 7¢ 5¢ 3¢..... do 25 & 10  
No. 15..... 7¢ 5¢ 3¢ 1¢..... do 25 & 10  
No. 16..... 5¢ 3¢ 1¢..... do 25 & 10  
No. 17..... 3¢ 1¢..... do 25 & 10  
No. 18..... 1¢..... do 25 & 10  
No. 19..... do 25 & 10  
No. 20..... do 25 & 10  
No. 21..... do 25 & 10  
No. 22..... do 25 & 10  
No. 23..... do 25 & 10  
No. 24..... do 25 & 10  
No. 25..... do 25 & 10  
No. 26..... do 25 & 10  
No. 27..... do 25 & 10  
No. 28..... do 25 & 10  
No. 29..... do 25 & 10  
No. 30..... do 25 & 10  
No. 31..... do 25 & 10  
No. 32..... do 25 & 10  
No. 33..... do 25 & 10  
No. 34..... do 25 & 10  
No. 35..... do 25 & 10  
No. 36..... do 25 & 10  
No. 37..... do 25 & 10  
No. 38..... do 25 & 10  
No. 39..... do 25 & 10  
No. 40..... do 25 & 10  
No. 41..... do 25 & 10  
No. 42..... do 25 & 10  
No. 43..... do 25 & 10  
No. 44..... do 25 & 10  
No. 45..... do 25 & 10  
No. 46..... do 25 & 10  
No. 47..... do 25 & 10  
No. 48..... do 25 & 10  
No. 49..... do 25 & 10  
No. 50..... do 25 & 10  
No. 51..... do 25 & 10  
No. 52..... do 25 & 10  
No. 53..... do 25 & 10  
No. 54..... do 25 & 10  
No. 55..... do 25 & 10  
No. 56..... do 25 & 10  
No. 57..... do 25 & 10  
No. 58..... do 25 & 10  
No. 59..... do 25 & 10  
No. 60..... do 25 & 10  
No. 61..... do 25 & 10  
No. 62..... do 25 & 10  
No. 63..... do 25 & 10  
No. 64..... do 25 & 10  
No. 65..... do 25 & 10  
No. 66..... do 25 & 10  
No. 67..... do 25 & 10  
No. 68..... do 25 & 10  
No. 69..... do 25 & 10  
No. 70..... do 25 & 10  
No. 71..... do 25 & 10  
No. 72..... do 25 & 10  
No. 73..... do 25 & 10  
No. 74..... do 25 & 10  
No. 75..... do 25 & 10  
No. 76..... do 25 & 10  
No. 77..... do 25 & 10  
No. 78..... do 25 & 10  
No. 79..... do 25 & 10  
No. 80..... do 25 & 10  
No. 81..... do 25 & 10  
No. 82..... do 25 & 10  
No. 83..... do 25 & 10  
No. 84..... do 25 & 10  
No. 85..... do 25 & 10  
No. 86..... do 25 & 10  
No. 87..... do 25 & 10  
No. 88..... do 25 & 10  
No. 89..... do 25 & 10  
No. 90..... do 25 & 10  
No. 91..... do 25 & 10  
No. 92..... do 25 & 10  
No. 93..... do 25 & 10  
No. 94..... do 25 & 10  
No. 95..... do 25 & 10  
No. 96..... do 25 & 10  
No. 97..... do 25 & 10  
No. 98..... do 25 & 10  
No. 99..... do 25 & 10  
No. 100..... do 25 & 10  
No. 101..... do 25 & 10  
No. 102..... do 25 & 10  
No. 103..... do 25 & 10  
No. 104..... do 25 & 10  
No. 105..... do 25 & 10  
No. 106..... do 25 & 10  
No. 107..... do 25 & 10  
No. 108..... do 25 & 10  
No. 109..... do 25 & 10  
No. 110..... do 25 & 10  
No. 111..... do 25 & 10  
No. 112..... do 25 & 10  
No. 113..... do 25 & 10  
No











## Hardware Novelties.

## Folding Gimlets and Screw-Drivers.

The illustrations given herewith represent the manner in which folding gimlets and screw-drivers are made by the Cincinnati Tool Co., Cincinnati, Ohio, Fig. 1.

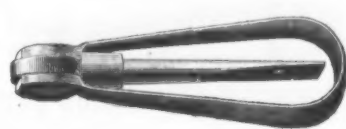
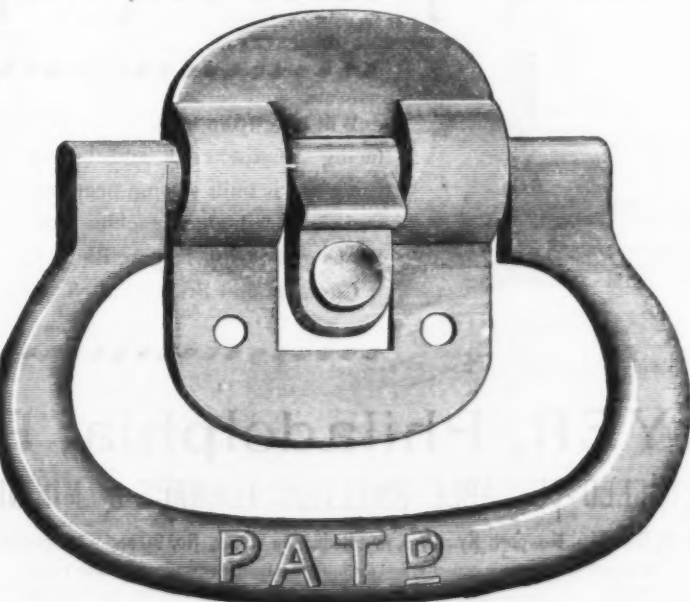


Fig. 1.—Folding Screw-Driver Closed.

showing one of the tools closed and Fig. 2 representing another tool open. They are obviously intended for use when it is desirable that a gimlet or screw-driver be carried in the pocket. The handles are described as made of refined malleable iron, and the tool itself of steel. The screw-drivers are made in 6 and 7 inch sizes, and the gimlets of the following sizes:  $\frac{1}{8}$ ,  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{7}{8}$  and  $\frac{1}{2}$  inch. The manufacturers call attention to the fact that these goods are made specially heavy and strong.

## The Noiseless Milk-Can Handle.

Hall & Carpenter, 709 Market street, Philadelphia, are sole agents for the Noiseless Milk-Can Handle, which is shown full size in the accompanying cut. It is well-known that the rattling noise of a milk-can is produced by the handles striking the body of the can; this great objection, Hall & Carpenter say, is entirely overcome by the use of the noiseless handle. The construction of the handle is so clearly shown in the cut, that but little description is necessary. The handle is made of malleable iron, and through the tongue at the middle passes a rubber plug or cork which projects about  $\frac{1}{4}$  inch each side. By this means the handle is prevented from striking the side of

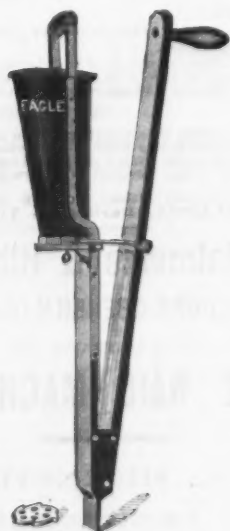


The Noiseless Milk-Can Handle.

the can, the rubber serving as a buffer. The rubber is slightly conical in shape, with the smaller end at the outside, so that it cannot become loosened during use.

## The Eagle Rotary Planter.

The Eagle Machine Co., Lancaster, Ohio, are making the Eagle Rotary Planter, which is illustrated in the accompanying cut. The feature in it to which they direct special attention is that the handles are set at right angles to each other, in order to make it more convenient and easier to operate. They also lay emphasis on the fact that it has a rotary drop instead of a slide drop, as in other hand corn planters, and they make the point that the operation of filling and discharging is so rapid that slide drops are liable to miss planting, while the Eagle



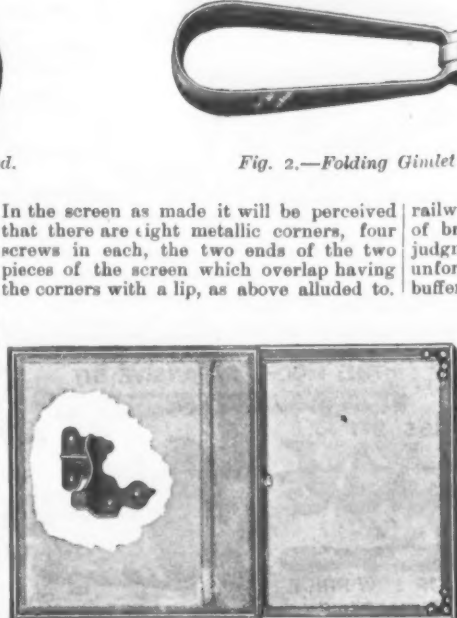
The Eagle Rotary Planter.

rotary drop, they claim, never misses. By this construction four feed cups are at all times exposed to the corn, thus giving four chances instead of one.

## Porter's Patent Extension Window Screen.

The illustration given herewith represents a new window screen, patented March 9, 1886, which is being put on the market by

E. N. Porter & Co., Burlington, Vt. As the cut represents, there is an iron lip on four of the corners which runs in a wood groove in the frame, thus reducing the friction to a minimum. It is on this lip corner that the patent has been obtained. Its form is represented in the cut, the wire netting being broken away to permit its representation.



Porter's Patent Extension Window Screen.

The strength of the screen as thus constructed, and the ease with which it is operated, are the points on which the manufacturers lay emphasis. It is made in three sizes—19 x 33, 21 x 35 and 21 x 39. Other

sizes are made to order. The screens are packed in crates of one dozen or more to suit purchasers.

## Pocket Screw-Driver.

The Nashua Lock Co. some time since devised a folding screw-driver for pocket use, designed particularly for traveling salesmen, hardwaremen and others, for convenience in showing their goods. It proved to be such a handy article that the idea suggested itself of supplying it to the trade for the benefit of those who might desire such a tool. The nature and design of the article will be understood by an examination of the engraving below. In some particulars the article resembles the folding keys which for many years past have been furnished with certain kinds of door locks. When folded it



Folding Pocket Screw-Driver, Full Size.

measures a little less than 3 inches, and when extended measures  $4\frac{1}{2}$  inches. The ring of the handle is sufficient to afford ordinary leverage, while the construction is such that it may be used half-open, thus affording a material increase of leverage. Such a tool as this is very convenient for carpenters and other mechanics for pocket use, or to be kept in a convenient drawer in a desk, or to be used about small machines.

Mr. Leo Daft, of Greenville, N. J., well known from his connection with the movement of running trains by electricity on the Ninth Avenue Elevated Railroad in this city, has recently received a patent for an invention relating to electric motors. It relates more particularly to the means for reversing such motors, and has for its object an improved construction of the reversing mechanism or brush carriers, so that they may be readily and easily operated, and that the brushes shall bear upon the commutator when in use in such a manner as to secure the highest efficiency and the least wear at the points of contact. Arrangements are made also that they may be readily thrown out of contact with the commutator when desired.

## Hydraulic Buffer-Stop for Railways.

At the last meeting of the British Institution of Mechanical Engineers Mr. Alfred A. Langley described a hydraulic buffer-stop which was designed by him to prevent the severe accidents arising from trains overrunning terminal stations or dead ends of

railways. Hitherto, when through failure of brakes, defect of locomotive, or bad judgment in not reducing speed, a train has unfortunately dashed into an ordinary dead buffer-stop, the result has frequently been disastrous, resulting generally in the telescoping and breaking up of the carriages, with attendant fatalities and injuries to passengers. This danger arises not so much from the actual concussion of the engine against the buffer as from the recoil consequent upon a heavy moving body encountering a fixed dead obstruction; the ordinary buffer stop, as is well known, is usually constructed with a view to the greatest possible rigidity.

The hydraulic buffer-stop, both in principle and in effect, is diametrically opposed to the ordinary plan. Its chief advantages are: 1. Absence of recoil after collision. 2. Continuous uniform resistance for bringing a train to rest. 3. Absence of shock or breakage either in train or in buffer. The chief feature is the application of hydraulic resistance by the use of pistons working in horizontal cylinders filled with water and fixed in line with the buffers of the rolling stock. The cylinders are 4 feet  $7\frac{1}{2}$  inches long, cast with a flange on each end, and bored out to 12 inches diameter, with  $2\frac{1}{2}$  inches thickness of metal. Covers are bolted to the flanges, and both of them are fitted with hydraulic glands for the passage of the piston-rod, which goes through both ends of the cylinder. The packing consists of a hydraulic cup-leather inserted in the stuffing box and fitting the piston rod tightly. The rod is of solid steel,  $3\frac{1}{2}$  inches diameter and 13 feet 1 inch long over all. An india-rubber ring  $\frac{1}{2}$  inch thick is fixed round the rod on each side of the piston, to form a cushion between the piston and the cylinder ends.

The piston is turned to an easy fit, the clearance space between its circumference and that of the cylinder being equal to an area of 0.38 square inch. In addition to this constant space a gradually diminishing area of passage has been contrived, whereby a uniform resistance of about 500 pounds per square inch is maintained throughout the stroke. A wrought-iron strip 3 inches wide is fastened by stud-screws along each inner side of the cylinder, projecting  $\frac{1}{8}$  inch into the cylinder at the beginning of the stroke and tapering up to  $1\frac{1}{2}$  inches at the rear end. A corresponding slot  $1\frac{1}{2}$  inches deep is cut out in each side of the piston. The resistance offered by the water to the movement of the piston depends on two things, namely, the velocity of the movement and the amount of clearance space between the piston and cylinder. The velocity of movement will always be greatest at the commencement of the stroke, but as the piston is forced backward the clear space between the tapering strips and the slots in the piston becomes less and less, so that, notwithstanding the diminishing speed of the piston, an equal amount of resistance is maintained until the train is brought to rest. To insure keeping the cylinders constantly filled with water a supply-pipe is fixed to the front end of each.

It has been proved by repeated experiments that a 4-foot stroke is sufficient for all practical purposes; a train going at least 10 miles an hour is brought to a stand before the stroke is completed, without any damage whatever either to train or to buffer. The interiors of the first set of cylinders tried were bored taper, and the size of the pistons was arranged so as to give a uniform

bottom weight and the holding bolt, to take the first shock of the strain upon the chain when the buffer is struck by a train. Several schemes were tried for bringing the pistons back after impact. Strong india-rubber bands fastened to the cylinder and to the end of the piston-rod proved very troublesome, as it was difficult to obtain bands of the required elasticity and at the same time thoroughly reliable. A plan was also successfully carried out for returning the pistons by the pressure of a head of water acting on them. In this case the rod does not pass through the rear of the cylinder; and the water displaced by the insertion of the rod at the front end is forced into a tank of sufficient height to drive the piston forward in its return stroke. The plan of counterweights, however, has proved the best for general use.

The body of the buffer-stop consists of a block of Portland cement concrete. Timbers are let in the top, to which the cylinders are secured by an iron clamp passing over each cylinder end. The top of the buffer is boarded over, and if necessary may be utilized for offices, refreshment-rooms, &c. No difficulty is experienced from freezing of water when under a roof; but to prevent all possibility of damage by frost a small gas jet may be kept burning under the cylinders during cold weather. At first the buffers were designed with a crosshead or beam connecting the two buffer-heads; but this was soon abandoned through fear of the buffers being pressed in unequally. Air was also thought of as a resisting medium in place of water. In a case of this sort, however, the use of air is to be avoided, on account of the risk of explosion, which would, as in the bursting of boilers, cause the parts to fly, and might prove dangerous.

The risk of accidents from trains running into dead ends is, of course, daily increasing with the extension of powerful brakes. On most railways it is a rule that drivers are not to rely on the brakes for coming into stations; but it is in the nature of things that they will do so, and it frequently happens that a driver does run into a station at higher speed than he intended or expected. In such cases the use of these buffers will at any rate vastly diminish the liability to serious accidents, as frequent trials have proved that they afford resistance sufficient to stop a train at 10 miles an hour without shock or any damage whatever.

Mr. Langley stated that the Liverpool street and Fenchurch street stations, London, on the Great Eastern Railway, are furnished with these stops, which continue to answer perfectly. At this station a refreshment-room is erected immediately over the cylinders, and a train running into the stop at 10 miles an hour produces no shock whatever in the room. The first cost of a hydraulic buffer-stop complete, with a 4-foot stroke, is about \$750. The cost of maintenance is very small indeed compared with that of maintaining the ordinary stops at terminal stations, which are constantly undergoing renewal or repairs. The hydraulic buffer-stop takes up much less room in a station than the ordinary dead buffers; the latter latter would occupy a length of 10 or 14 feet, shortening the line of way by this amount of valuable space; but the hydraulic stop, if fixed under a roof, require a space of only about 2 feet length out of the available running line, the cylinders being fixed under the building. It would not be safe to fix a dead buffer under or close to a building, as the shock of a train would damage the latter. The length of stroke is an important consideration; and several trials had to be made before the stroke of 4 feet was adopted at Liverpool street and Fenchurch street stations, as being about the right length. When a moving body is opposed by a retarding force properly applied it can be stopped in a comparatively short distance, as in catching a cricket ball, by which the hands would be hurt if they were not quickly withdrawn the moment the ball touched them. A spring does just what it ought not to do, offering very little resistance at first, when most required, and a great deal of resistance at last, when least required. This causes a recoil almost as violent as the first blow. If a buffer-stop were required to receive trains running at a speed not exceeding 4 miles an hour, a stroke of 2 feet would probably be sufficient to prevent any violent shock. This would meet the case of ordinary shunting, and would, of course, cost much less than a buffer-stop fixed with a 4-foot stroke, but in the event of a train overrunning, or the brakes failing to act, it might not be sufficient.

The theory of the hydraulic buffer-stop appears to be that its resistance varies approximately as the square of the train's velocity, while the train's moving force varies also approximately as the square of its velocity, so that the piston-rod will be pushed inward through about the same actual length of stroke, whatever be the velocity. The number of units of work accumulated in a train moving with a given velocity can be easily estimated, but to calculate the effect upon the hydraulic buffer-stop at various parts of the stroke is more difficult, because in the case of a train of, say, 10 carriages there are more than 40 springs belonging to the vehicles which come into play when the train runs into the buffer-stop, and cause an alteration in the mode in which the hydraulic buffer has to meet the work, and this is provided for by the taper strips being properly shaped in relation to the slots in the pistons. The total units of work in the train must, of course, be absorbed by the hydraulic buffer-stop within the range of its stroke, and it is probably to a large extent the action of the train springs which causes the short stroke of only 2 or 4 feet to be so effective. The hydraulic buffer-stops with 4-foot stroke at Liverpool street and Fenchurch street stations were fixed about four years ago, and were the first hydraulic buffer-stops ever put up, so far as the writer is aware. Hydraulic buffer-stops with 2 foot stroke have recently been fixed at the New Exchange station of the London and North-western Railway in Manchester.

Mr. Langley added that after there had been several accidents on the Great Eastern Railway, owing to trains going into fixed stops, Mr. Parkes, the chairman of the company, said that something must be done to

prevent damage to the trains. Accordingly he (Mr. Langley) set to work and devised the contrivance which had been described in the paper. A great number of trials had been made, and so far the method had proved satisfactory. Mr. Rapier, of the firm of Ransome & Rapier, had told him that he was now making a hydraulic stop with an 8-foot stroke for Messrs Brunel & Barry, and they calculated that it would resist a train running at 20 miles an hour. He had recorded the pressures as nearly as he could by a gauge, and the result was somewhere about from 800 pounds to 1000 pounds per square inch.

## Imports.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending March 31, 1886:

Hardware.	Naylor & Co.
Baker Hermann & Co.	Rods, bdls., 1505
Hardware, cutlery	Pig, tons, 320
& guns, pkgs., 192	Spiegel, kg., 250,000
Brown Bros. & Co.	Pierson & Co.
Cases, 11	Sheets, bdls., 129
Calcedo, Marquis de	Schlagmann J. W. & Co.
Mach., case, 1	Wire rods, pkgs., 241
Davies, Turner & Co.	Stetson Geo. W. & Co.
Mach., pkgs., 18	Pig, tons, 100
Davies Bros.	Order.
Case, 1	Spiegel, tons, 600
Dieckhoff, Raffler &	Pig, tons, 294
Co.	Rods, pkgs., 19,008
Cases, 13	Wire, coils, 11,229
Downing R. F. & Co.	Old flange rails, pcs.,
Hardware, case, 4	3331
Drexel, Morgan & Co.	Old iron, pieces, 1002
Arms, cs., 13	Wire rods, coils, 783
Field, Alfred & Co.	Old rails, pcs., 4915
Cases, 4	Old nails, bdls., 11
Anvils, 180	
Spades, bdls., 3	
Goodspeed, Chas. F.	
Arms, cs., 4	
Gormully & Jeffrey,	
Case, 1	
Hartley & Graham,	
Arms, cs., 11	
Harmer, Hays & Co.	
Cases, 3	
Judd H. L. & Co.	
Cases, 8	
Jackson, W. H.	
Pics, cs., 7	
Kastor A.	
Cutlery, case, 1	
King, Ezekiah	
Cases, 8	
Johnson, J. & Co.	
Mach., pkgs., 131	
Lamarque H. & Sons,	
Iron nails, cks., 31	
Lamberzon, Frhr-	
mann & Co.	
Arms, cs., 4	
Lingerke Wm. & Co.	
Cases, 2	
Maddock Henry,	
Mach., crates, 27	
Maddock W. H.	
Mach., pkgs., 38	
McClay & Sanders,	
Cases, 3	
Morris L. W. & Sons,	
Mach., case, 1	
Morris J. S. & Sons,	
Arms, cs., 3	
Newton & Shipman,	
Files and hammers,	
case, 1	
Oastley W. C. & Co.	
Machinery, cs., 35	
Peters Lothman & Co.	
Case, 1	
Rosenthal & Co.	
Cases, 10	
Russell & Erwin Mfg. Co.	
Locks, cs., 6	
Schutte W. & Co.	
Cases, 6	
Sarl & Danby,	
Machinery, cs., 2	
Sheldon G. W. & Co.	
Cutlery, case, 1	
Machinery, bxs., 3	
Star Union Line.	
Cases, 2	
Schoverling, Daly &	
Gales,	
Cases, 7	
Sellers W. B.	
Cutlery, case, 1	
Steinhart & Bro.	
Cases, 6	
Strauss, Blumenthal &	
Co.	
Cases, 3	
The Lackawanna Line,	
Arms, case, 1	
Taylor Theo.	
Cases, 3	
Thurnauer G. M.	
Pigs, 4	
Watson, Sumner & Co.	
Mach., case, 1	
Wolf H. & Co.	
Case, 1	
Wienbusch & Hilger,	
Hdw. and cutlery,	
pkgs., 16	
Witte John G. & Bro.	
Needles, case, 1	
Order.	
Anvils, pkgs., 153	
Cases, 6	
Pieces, 792	
Guns, cs., 5	
Machinery, cs., 2	
Iron.	
Baring Bros. & Co.	
Wire rods, coils, 391	
Bundles, 575	
Bars, 2242	
Broekner, Evans & Co.	
Wire netting, coil, 1	
Brown Bros. & Co.	
Spiegel, lot, 1	
Cary & Hoan.	
Rods, bdls., 314	
Coddington T. B. & Co.	
Sheet, bdls., 332	
Sheets, bxs., 13	
Crocker Bros.	
Pig, tons, 270	
Ferro iron, tons, 69	
Old Dominion S. S. Co. 4	
Wire rope, coil, 1	
Metals.	
Baldwin & Co.	
Platina, case, 1	
Dickerson, Van Dusen &	
Co.	
Antimony, cks., 17	
Gould R. S.	
B-rass foundry, cs., 7	
Hollender Fred. & Co.	
Metals, case, 25	
Ironclad Mfg. Co.	
Tin plates, bxs., 49	
Jackson R. D.	
Tin, bdls., 10	
Naylor & Co.	
Lead, pigs, 274	
Phelps, Dodge & Co.	
Tin plates, bxs., 3044	
Antimony, cks., 50	
Roof C.	
Lead plates, 600	
Schulze, Borge & Co.	
Zinc dust, cks., 54	
Smart D. R.	
Tin plates, bxs., 485	
Wheeler, Falconer & Co.	
Tin plates, bxs., 550	
Wittenman Bros.	
Metal caps, cs., 23	
Order.	
Tin plate, bxs., 1508	
Quicksilver, bottles,	
500	
Tin sheets, bxs., 52	
Tin, bxs., 499	
Cop., ingots, 12,178	
Copper, cks., 40	
Copper, 1500	
Tin, ingots, 1500	
Lead, pigs, 1908	

The imports at this port of Hardware, Cutlery and Metals during the week ending March 26 were as follows:

Quantity.	Value.
Anvils.....	182 \$1,573
Brass goods.....	33 1,732
Bronzes.....	22 3,025
Chain and anchors.....	6 256
Clocks.....	44 5,771
Copper.....	12,876
Cutlery.....	67 22,198
Dutch metal.....	5 1,538
Electrotype.....	4 425
Gas fixtures.....	3 1,107
Guns.....	15 2,180
Hardware.....	1 60
Lead, pigs, tons.....	150 1,507
Iron, sheet, tons.....	24 1,778
Iron, spiegel, tons.....	1,623 53,990
Iron ore, tons.....	380 965
Iron, other, tons.....	1,757 27,567
Lead, pigs.....	4,568 14,612
Machinery.....	31 8,812
Metal goods.....	378 23,710
Nails.....	6 738
Needles.....	5 621
Nickel.....	6 2,483
Platina.....	3 12,215
Plated-ware.....	5 455
Pins.....	7 797
Plumbago.....	147 577
Saddlery.....	14 2,927
Steel.....	36,919 46,351
Tin, bxs.....	32,023 164,165
Tin, 1,088 slabs; 112,422 lbs.....	22,674
Wire.....	23 1,790
Zinc, B.....	328,095 8,125
Zinc oxide.....	300 1,243



## Old Metals, Rags, &amp;c.

The purchasing prices offered by dealers are as follows:

Heavy Copper	1 lb.	\$0.08	@	\$0.08 1/2
Light Copper	1 lb.	.06	@	.07
Copper Bottoms	1 lb.	.06	@	.06 1/2
Brass, Heavy	1 lb.	.05	@	.05 1/2
Brass, Light	1 lb.	.04	@	.04 1/2
Composition, Heavy	1 lb.	.07 1/2	@	.08
Lead, Heavy	1 lb.	.03 1/2	@	.04
Tea Lead	1 lb.	.02 1/2	@	.03
Zinc	1 lb.	.02 1/2	@	.03
Wrought Iron	1 ton	15.00	@	16.00
Light Iron	1 ton	9.00	@	9.00
Stove Plate Iron	1 ton	13.00	@	14.00
Machinery Iron	1 ton	13.00	@	14.00
Grate Bars	1 ton	5.00	@	6.00
Stereotype Plates	1 lb.	.04 1/2	@	.05
Electrotype	1 lb.	.03 1/2	@	.04
Small Type	1 lb.	.03 1/2	@	.04
Canvas, Linen	1 lb.	.03 1/2	@	.04
Canvas, Cotton	1 lb.	.03 1/2	@	.04
Canvas, No. 2	1 lb.	.03 1/2	@	.04
White No. 1	1 lb.	.03 1/2	@	.04
White No. 2	1 lb.	.03 1/2	@	.04
Second	1 lb.	.03 1/2	@	.04
Soft Woollens	1 lb.	.05 1/2	@	.06
Mixed Rags	1 lb.	.01 1/2	@	.01 3/4
Gunny Bagging	1 lb.	.01 1/2	@	.01 3/4
Lute Butts	1 lb.	.01 1/2	@	.01 3/4
Kentucky Bagging	1 lb.	.02 1/2	@	.03
Book Stock	1 lb.	.01 1/2	@	.01 3/4
Newspapers	1 lb.	.00 1/2	@	.01
Waste Paper and Scrap	1 lb.	.00 1/2	@	.01
Kentucky Bale Rope	1 lb.	.03 1/2	@	.04

## Machinery in Mines.

Mr. Henry Davey, writing in a recent issue of the *Mechanical World*, contributes, among other things, the following to the subject of "Machinery in Mines":

It is a curious fact that, although the plunger pump has been almost universal in Cornwall for the last 50 years, it has until lately been little adopted in collieries. It is usually employed to force the water 40 fathoms only, so that in a shaft 200 fathoms deep there would be five pumps, lifting the water from the bottom in stages, from one to the other. The lowest pump is usually a bucket pump, for convenience of sinking. Stage pumping is often convenient where feeders of water occur in the shaft at different levels, because, as a question of power, it is more economical to pump the water from where it is found, instead of letting it run to the bottom of the mine and pumping it from there; but stage pumping is generally very troublesome, and requires very careful supervision. It becomes necessary to have a pipe from one pump to the next pump below it, so that the water may be run down to keep all the pumps equally charged under the varying conditions of wear and tear. Trained men are kept for this and the other work connected with the pumps. In Cornwall they are called "pitmen" and in the North of England "pump doctors."

The plunger pump has of late years been so improved in form that it may be safely employed to pump water even as high as 200 fathoms in one direct lift, so that, so far as the pumps are concerned, the necessity does not remain for stage pumping. The old form of plunger pump was not suitable for pumping to a great height in one lift. It was weak in form and inconvenient of access to the valves, and involved risk of life to the pitmen, because all the operations of changing valves and repairs to the pump had to be done in the shaft. The modern and most approved method of draining mines economically, without risk of flooding, is to have two pumping engines, each capable of draining the mine, and provided with plunger pumps. In the Cornish engine the practical limit of expansive working is soon reached. Not so in the compound engine; and as the compound engine is double-acting, and the Cornish engine necessarily single-acting (when worked expansively), the compound has distinct advantages, both as regards power and economy. Of late years the compound engine has met with a large application in mines.

As a recent example of heavy pumping performed by a compound engine with the improved plunger pumps before described, the author selects one of the engines recently erected by the South Staffordshire Mines Drainage Commissioners. This engine will raise 4,000,000 gallons per day from a depth of 600 feet. It has cylinders 52 inches and 90 inches diameter by 10-foot stroke, and works 27 inches diameter plunger pumps, 10-foot stroke, equal in power to a 120-inch Cornish engine. It is not unusual to find in collieries as much as 6 tons of water to 1 ton of coal—that is to say, there are collieries raising, say, 6000 tons of coal per week and 36,000 tons of water in the same time.

The conditions of mining vary so much that it is impossible to frame any general rules as to the type of machine which is best suited to any particular mining operation. The old form of pumps, worked from spear-ropes, as we have before seen, gave considerable trouble and involved costly maintenance, considerations which favored the introduction of underground pumping engines. In underground pumping engines the engine and pump are combined in one self-contained machine, employed to force the water from the position in which it is placed in the workings direct to the surface through a single pipe. Sometimes the boilers for working the engine have been placed in the workings near the engine, but generally steam has been taken down through a pipe from boilers situated on the surface. It is seldom that very heavy pumping is performed on this plan. In many situations it is convenient and desirable, but in an economical point of view there is a serious loss by condensation in conveying steam down the pit.

## CONTENTS.

	PAGE.
The Plant of the Dayton Coal and Iron Co. Illustrated	1
The Report of the Commissioner of Labor	1
The Russian Petroleum Trade	5
Reconstructed Blast Furnaces, Shelby, Alabama	7
Armored Turrets for Fortifications	7
Hardware in Germany	9
Amended Rules and Regulations for Steamboat Boilers	11
The Foreign Trade of Chili	11
Scientific and Technical:	
Fast Tunneling Work	13
A Deep-Sea Lighthouse	13
Aluminum Iron and Steel	13
Foreign Markets	13
Latest Legal Decisions	15
Trade Publications:	
Boiler Makers' Materials	15
Pulleys	15
Feed-Water Heaters	15
General Machinery	15

Steam Engines	15
Air Compressors	15
Wire Nail Machines	15
The Week	17
Jet Propulsion of Ships	17
Mechanical:	
Revolving Screens	19
The Future of the Steam Engine	19
Locomotive Boiler Explosions	19
The Man Automatic Cut-Off Engine. Illustrated	19
A New Pipe Crimper. Illustrated	21
Preventing Boiler Scale	21
Improved Steam Glue Heater. Illustrated	21
Four-Cylinder Locomotives for Increased Tractive-Power	21
Editorial:	
The Knights of Labor	24
The Lake Superior Mines in 1885	24
The Central American Republics	24
Will Employers Organize?	24
Washington News	25
Wire-Drawing Without Pickling	25
Trade Report:	
British Iron and Metal Markets	29
Financial	29
New York Iron Market	29
Metal Exchange	29
Philadelphia	30
Pittsburgh	30
Chicago	30
Chattanooga	31
Birmingham	31
Cincinnati	31
Louisville	31
St. Louis	31
Detroit	31
Coal Market	31
General Hardware	32
Manufacturing:	
Iron and Steel	35
Machinery	35
Hardware	35
Miscellaneous	35
The Conflict of Capital and Labor	35
The Manganese Mines of the Caucasus	35
The Railroad Strike	35
The Metal Exchange Election	35
Exports	35
Current Hardware Prices	36
Wholesale Metal Prices	36
Hardware Novelties:	
Folding Gimlets and Screw-Drivers. Illustrated	39
The Noiseless Milk-Can Handle. Illustrated	39
The Eagle Rotary Planter. Illustrated	39
Porter's Patent Extension Window Screen. Illustrated	39
Pocket Screw-Driver. Illustrated	39
Hydraulic Buffer-Stop for Railways	39
Imports	39
Old Metals, Rags, &c.	40
Machinery in Mines	40
Encouraging Ingenuity Among Workmen	41
English Letter	41
Philadelphia and Pittsburgh Hardware and Metal Prices	59
Boston Hardware and Metal Prices	60



## POST'S PATENT IMPROVED EUREKA SAP SPOUTS, THE BEST IN THE WORLD.

Samples, Circulars and Terms sent free to the trade only. Address C. C. POST, Burlington, Vt.

## ASBESTOS PACKED STRAIGHTWAY COCKS

—FOR—  
STEAM, GAS, AIR, AMMONIA, Etc.  
The BEST Steam Valve Ever Produced.  
TRY THEM.

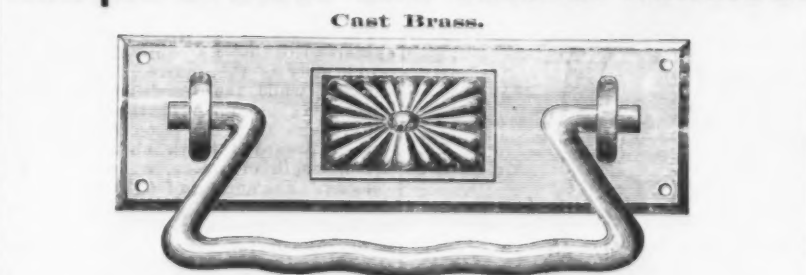
As the plug comes in contact only with VULCANIZED ASBESTOS, it never cuts, grinds or sticks, as is the case with ordinary cocks.  
This Cock always opens and closes easily and remains absolutely TIGHT where all other Valves or Cocks will leak.  
They are recommended for Steam, Gas, Ammonia in all its forms, Chemicals, Boiler Blow-off, or where a vacuum is required, and ALL DIFFICULT places.  
The regular Cocks are guaranteed to stand a steam pressure of 900 pounds per square inch, but special goods are made and guaranteed to stand 2000 pounds per square inch. We also make Cocks to stand 1000 degrees of superheated steam, Gland End Cocks for Ice Machines and all other difficult places. Either Screw or Flange ends as required.

All Goods Warranted to Give Satisfaction.  
SEND FOR DESCRIPTIVE CIRCULAR AND PRICE LIST.

## FAIRBANKS &amp; CO.,

311 Broadway, New York. 216 Main St., Buffalo, N. Y. 302 Wood St., Pittsburgh, Pa.  
17 Light St., Baltimore, Md. 882 Broadway, Albany, N. Y. 715 Chestnut St., Philadelphia, Pa.  
FAIRBANKS, BROWN & CO., 88 Milk St., Boston, Mass.  
AND THE TRADE GENERALLY.

## Antique Drawer and Cabinet Handles.



OF A VARIETY OF PATTERNS.

Manufactured by

## J. B. SHANNON &amp; SONS,

1020 Market Street, - - Philadelphia.

## WOOD WORKING MACHINERY

FOR  
Planing Mills, Carpenters and Builders,  
Furniture and Chair Factories, Car  
and Agricultural Works, and  
General Wood Workers.

MANUFACTURED BY  
**THE EGAN CO.,**  
Nos. 179 to 199 W. Front St.,  
CINCINNATI, O., U. S. A.

SELF-FEEDING RIP SAW.  
Feeds from 60 to 120 feet per minute. Best machine of the kind made.  
THOS. P. EGAN, Pres't. EDWIN RUTVEN, Sec'y.  
FREDERICK DANNER, Sup't.

## Bit Braces of all Kinds and of Superior Quality.

IVES PATENT TAP BORERS

NEW PATERN

NEW HAVEN RACHET BRACE

Expansive Hollow Auger, 3/4 to 1 1/2 inch.

Expansive Bits, 3/4 to 1 inch.

Hollow Augers, All kinds.

Cast Steel Augers and Auger Bits of all Kinds and Best Quality.

Patent Auger Handles. These goods are carefully manufactured and from the best of stock.

NEW HAVEN TOOL HOLDER. It has a nice Rosewood Handle, for family use, from which it is easily detached for use in an ordinary Bit Brace. It has three good Cast-Steel Screw Drivers of various sizes, a Countersink each for wood and iron, and other small, convenient tools.

CAST STEEL BIT DOUBLE SPUR

COUNTER SINK No 1

EXTRA AUGER HANDLE No 2

THE MODEL EXPANSIVE BIT

SPOFFORD BRACE

JENNINGS BIT

SPOKE

IMPROVED SPOFFORD

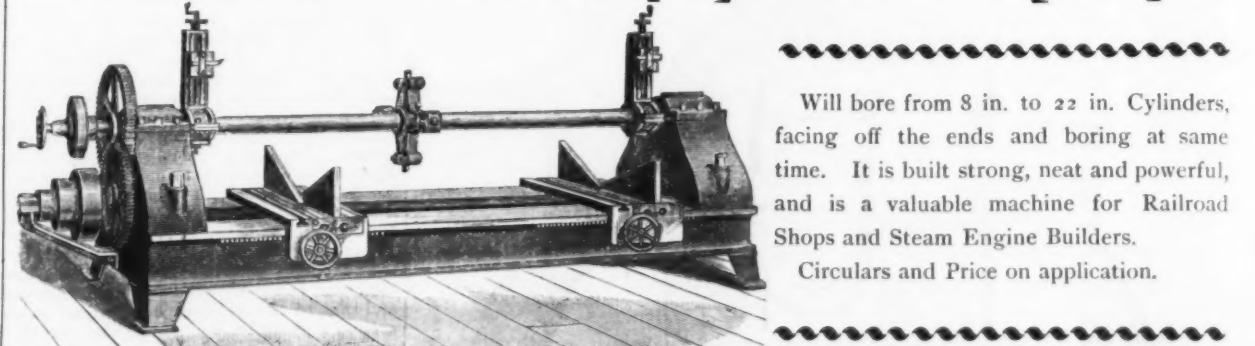
A SUPERIOR LOW PRICE AUGER HANDLE

TRIMMER

CAR BIT

W. A. IVES & CO. New Haven, Conn.

## CYLINDER BORING &amp; FACING MACHINE



Will bore from 8 in. to 22 in. Cylinders, facing off the ends and boring at same time. It is built strong, neat and powerful, and is a valuable machine for Railroad Shops and Steam Engine Builders.  
Circulars and Price on application.

## PEDRICK &amp; AYER, Philadelphia, Pa.

## HARTSFELD PORTABLE SMELTING FURNACE &amp; MINING CO.,

P. O. Box 115, Newport, Ky., U. S. A. Reduction Works, No. 90 and 92 Thornton St.

In sizes from 5 to 60 ton capacity, and the following licensed manufacturers on royalty:

The Engraving represents the Hartsfeld Portable Water Jacketed Smelting Furnace, and a Separator Crucible.

IMRAY & CO., London, England, and Melbourne, Australia.  
F. A. HUNTINGTON & CO., Chihuahua, Mexico.  
PARKER, LACY & CO., Auckland, and Chili, S. A.  
W. T. GARRATT & CO., San Francisco, Cal., for the Pacific Coast.  
McILVAIN & SPIEGEL, Cincinnati, Ohio.  
Letters Patent have been secured in all principal foreign countries and are sold in shares, trade, royalty or otherwise. Run your eye over this and return answer: silence means no! Catalogue free.  
The following companies and firms have ordered plants, as follows: The Kentucky Smelting and Mining Co., of Louisville, Ky., a 30-ton furnace for Idaho; The Santa Barbara Mining and Smelting Co., of Newport, Ky., a 15-ton furnace for Sonora, Mexico; Gasert, Black & Co., of Crook City, Mont., a 15-ton and a 50-ton furnace; Wright & Homans, of Rapid City, Dakota, a 5-ton furnace. Several others are now awaiting a test of their ores before placing their orders.

MANUFACTURED BY THE  
Hartsfeld Portable Smelting Furnace and Mining Company,  
NEWPORT, KY., - - U. S. A.

**MOULTON'S LEMON DRILL**

PATENT GRANTED.

Will extract the last drop of juice from large or small lemons in 2 seconds, and a child can easily operate it.

RECOMMENDATIONS:

BURLINGTON, VT., Sept. 5, 1885.  
W. F. MOULTON.  
Dear Sir: I have used and am selling your Lemon Drill, and consider it the best article for extracting the juice from lemons that I have ever seen. My customers are very much pleased with them.  
W. B. McKILLIP, Grocer.

BURLINGTON, VT., Dec. 29, 1885.  
MR. W. F. MOULTON.  
Dear Sir: I am using one of your Lemon Drills and am very much pleased with it. I think it an article every housekeeper will appreciate when tried.  
MRS. C. H. MORRISON.

DIRECTIONS.—Pare the end of lemon and drill out, working the Drill with rotating motion of the hand, holding lemon still. Gets more and better juice than any squeezer, extracting none of the poison from the rind. Is worth more than three of the best squeezers and sells for 10 cents. Wash as soon as used. Sent by mail on receipt of 10 cents in 2 cent stamps, or \$1.41 per dozen. Large discount to the trade. Ask your Grocer, Hardware and Notion Merchants for them.  
Agents Wanted. They sell at sight.  
All orders or communications should be addressed to the Patentee and Sole Manufacturer,  
W. F. MOULTON, Burlington, Vt.

**Malmedie & Hiby,**  
DUSSELDORF-ÖBERBILK (Germany),  
MANUFACTURERS OF  
**WIRE NAIL MACHINES.**  
L. HERNSHEIM,  
16 and 18 Exchange Place, New York,  
Sole Agent for the United States and Canada.

**THE BRUSH-SWAN ELECTRIC LIGHT CO.**  
W. L. STRONG, President. A. D. JULLIARD, Vice-President. G. McFALL, Secretary.  
R. W. ABORN, Treasurer. JOHN B. POWELL, Gen'l. Manager.  
REMOVED to Nos. 204, 206, 208, 210 Elizabeth Street, New York,  
Where Electric Apparatus for all the various modes of lighting and transmitting of power are in operation. No other system is as economical in installation and maintenance. No other electric light is as durable—the first machines made are still in daily operation.

The System Comprises  
Arc Lights of various sizes.  
Arc and Incandescent Lights from one Dynamo and Circuit.  
Incandescent Lights of various sizes from special Dynamo for Central Station Lighting.  
Cost of Apparatus greatly reduced. Surveys and Estimates by experts.



**THOUSANDS OF THE BEST**  
**LE PAGE'S**  
**LIQUID GLUE**

IS USED IN THE  
 UNITED STATES ARSENALS,  
 SMITHSONIAN INSTITUTION,  
 U. S. PATENT OFFICE,  
 U. S. ENVELOPE CAR CO.,  
 PULLMAN PALACE CAR CO.,  
 MASON & HAMLIN ORGAN CO.,  
 And by thousands of other first class  
 manufacturers and mechanics  
 throughout the world  
 for all kinds of FINE WORK.

**IF YOU ARE A MANUFACTURER OR A MECHANIC, IT WILL SAVE YOU TIME AND MONEY. IF YOU ARE A DEALER SEND FOR PRICE LIST AND A SAMPLE CAN FREE.**

**AWARDED GOLD MEDAL** at the  
 World's Exhibition, London, 1883. Pronounced the  
**STRONGEST ADHESIVE KNOWN.**  
 The total quantity sold between Jan., 1880, and Jan., 1885,  
 in all parts of the world, amounted to OVER  
**32 MILLION BOTTLES.**  
 Everybody wants it. All dealers can sell it.

**IT MENDS EVERYTHING.**  
 Wood, Leather, Paper, Shoes, China, Rubber,  
 Glass, Jewellery, Metals, Stationery, Farmers' Implements,  
 Musical Instruments, Stairways, etc., etc.

**Strong as Iron. Solid as a Rock.**  
 NO HEATING.—NO PREPARATION.—ALWAYS READY.  
 Indispensable in every Family.  
 Sold in tin cans for Mechanics and Amateurs, and in  
 Bottles for Family Use on Glass, China, etc.

**FOR SALE BY**  
**DRUGGISTS, GROCERS, STATIONERS,**  
**HARDWARE DEALERS, &c.,**  
 Throughout the World.

**MANUFACTURED BY THE**  
**RUSSIA CEMENT CO.**  
**GLOUCESTER, MASS.**

New York Office, 96 Chambers Street.

**THE BERLIN IRON BRIDGE CO.,**  
 EAST BERLIN, CONN. \* BINGHAMTON, N. Y.  
 S. C. WILCOX, Pres. CHAS. M. JARVIS, Vice-Pres. and Chief-Engineer.  
 BURR K. FIELD, Sec'y and Treas. JAS. W. PEARL, C. E., Manager at Binghamton, N. Y.

**IRON BRIDGES & ROOFS.**  
**CORRUGATED IRON**  
**FIRE-PROOF**  
**DOORS & SHUTTERS.**

We make the only Iron Door or Shutter which is an absolute protection against fire, as proved by actual fire test.

**WRITE FOR PRICES.**

**BUFFALO HAMMER COMPANY, Buffalo, N. Y.,**  
 MANUFACTURERS OF A FULL LINE OF  
**SOLID CAST STEEL HAMMERS.**  
 Made from the Best Quality of Crucible Hammer Steel.



**No. 2 MACHINISTS' OCTAGON BALL PEIN HAMMER.**  
 EVERY HAMMER BEARING OUR STAMP IS FULLY WARRANTED.  
 Catalogues sent and Discounts quoted promptly. Export orders will receive prompt attention.

**THE**  
**Detective Burglar Alarm.**

WEIGHT, 6 OUNCES. PATENT PENDING.  
**Perfectly Safe and Simple in Construction.**  
 Can be applied to any door or window. The door cannot open without the alarm falling to the floor and exploding a No. 32 Blank Cartridge. Four Cartridges packed with every Alarm.  
 Endorsed by Hon. Wm. B. Smith, Mayor of Philadelphia. Gen. Jas. Stewart, Chief of Police.

**RETAIL PRICE, 35 CENTS.**  
 MANUFACTURED BY  
**Spencer E. Carr & Co.**  
 Ninth and Jefferson Sts., Philadelphia, Pa.

EASTERN AGENCIES: Dame, Stoddard & Kendall, Boston; Schorling, Daly & Gales, New York; A. G. Spaulding & Bros., New York; Wm. Cunningham, New York; Biddle Hardware Co., Philadelphia; J. C. Grubb & Co., Philadelphia; A. J. Reach & Co., Philadelphia; S. G. B. Cook & Co., Baltimore.

**BORAX.**  
**CHARLES PFIZER & CO.,**  
 81 Maiden Lane, New York,  
 Manufacturers of Refined and Dealers in Concentrated Borax.

**Encouraging Ingenuity Among Workmen.**

The Carron Co., whose works are in Stirlingshire, Scotland, have devised a plan for encouraging their workmen to invent and improve machinery and processes by a system of pecuniary rewards. The scheme, as communicated to us by the manager of the company, Mr. David Cowan, is as follows:

**Aims.**—To develop and encourage inventive talent among the workmen, to be utilized for improvement in quality of work and economy of production.

**Advantages.**—To the successful claimant a money reward, according to the merit of the invention or improvement introduced, the honor of the invention or improvement, and of adding to the prosperity of Carron Co.; a useful mental training, both to the successful and unsuccessful claimant, and in increased interest and pleasure in the daily routine of his work.

**Rules.**—1. Any workman or number of workmen, with the exception of those in charge of a department, or a chief foreman, in the employment of Carron Co. may claim an award on the following grounds:

(a) That he has either invented or introduced a new machine or hand tool into any department of Carron Co.'s Works.

(b) That he has improved any existing machine or tool, or adapted it to a new class of work.

(c) That he has invented, introduced, improved or rendered more useful any of Carron Co.'s manufactures.

(d) Or, generally, that he has discovered or introduced any method or arrangement by which the work of the company is rendered superior in quality or more economical in cost.

2. When any new idea occurs to a workman or workmen, on which he or they may intend to base any claim, he or they should, without delay, give notice to the secretary, in writing, signed by the claimant, with the view of establishing priority of claim in case of dispute. The secretary to submit the idea to the first meeting of committee for consideration, and, if approved of, facilities will be afforded him or them to carry out his or their idea (if unable to do it himself or themselves).

3. On the establishment of a claim under the conditions above specified, the committee are to make an award, at their discretion, of not less than £1, nor more than £10. A workman or workmen accepting the award of the committee, the improvement or invention becomes the property of Carron Co. In the event of the committee considering any invention or improvement worthy of a higher award, or protection by letters patent, they shall report the same to Carron Co. for their special consideration, and, if it is agreed upon to take out letters patent for said invention or improvement, Carron Co. shall have the first offer of accepting the absolute right to use or manufacture such improvement or invention, or payment of lump sum or royalty, as may be mutually agreed upon.

4. After the committee have completed their investigation of a claim the secretary shall intimate their decision to the claimant, and, if it is favorable, inclose an order on Carron Co., signed by himself, and countersigned by the company's manager, for payment of the amount awarded, and this order shall be payable on presentation to the cashier.

5. When any workman has received since the commencement of the scheme as many as five awards, the total amount of the awards being under £10, he shall receive a premium of £5. When the total amount of awards is from £10 to £25, a premium of £10. When the awards amount from £25 to £50, he shall receive a premium of £20. This being repeated every five succeeding awards.

6. The committee will meet on the first Monday of each month for the transaction of business.

7. The committee may call before them, as evidence on the claims made to them, any person they may think proper.

8. The committee shall, in case of difference of opinion, decide the matter by vote, the majority ruling. The chairman to have a casting vote.

9. The secretary shall, under the direction of the president, keep full minutes of the proceedings and decisions of the committee, which must be approved by the committee at the first meeting after that to which the minutes refer.

10. The committee reserve to themselves the right to modify, change or annul any or the whole of the foregoing rules.

**Note.**—Copies of these rules may be had from the secretary to the committee. Price three pence each copy.

**Suggestions.**—1. That no workman should hesitate to send in a claim for any invention or improvement he has made, as by so doing he not only deprives himself of the award to which he is justly entitled, but he also prevents the committee from acquiring a complete record of all inventions made in the works, including the names of the inventors.

2. That no workman should present a claim before giving it his most careful consideration and satisfying himself of its validity. By neglect of this precaution his claim may be rejected, and he thereby discouraged from making further efforts.

**Advice.**—The committee will at all times be pleased to give any information for the guidance of workmen.

The Edison Co. started in 1879, with a cash capital of \$500,000. This was a sort of preliminary fund to be devoted to experimental purposes. As the trials progressed the capital was from time to time increased. It is emphatically denied that during this chrysalis period the stock was watered a drop, but that the cash was plunked down in every instance except where Mr. Edison was concerned. To him amounts were issued from time to time for patents, in accordance with compact made with him. At last the cash capital of the company got up to \$1,080,000, of which \$400,000 was paid to Edison, \$85,000 remaining in the treasury of the company, and the balance has been issued in stock, the par value of which is \$100. During the early electric-

light excitement the stock sold at the fabulous price of \$4500 a share. This was followed by a violent reaction, and many who bought at the figures afterward saw it drop to \$400 a share. It is claimed that the "balloon" price of \$4500 was not warranted by the facts, and subsequently it was demonstrated, what the early enthusiasts neglected to discover, that the development of the business would require more time than they thought. Electric companies became as free as fresh air on a March morning; the Edison folks became involved in lawsuits in order to protect their patents, and the stock gradually drifted away below par. During the last three years a new set of stockholders have taken hold. They have struggled with the litigation, and have succeeded in raising the price of the stock from \$40 to \$200 a share.

**English Letter.**

(From Our Regular Correspondent.)

LONDON, MARCH 15, 1886.

THE WEEK has been characterized by a continuance of remarkably severe weather, with sharp frosts every night and more snow in the northern parts of the country. The previous lack of employment and interruption of trade, agriculture and commerce has continued, therefore, so that I have again to report an unrelieved depression. There are those, it is true, who are disposed to regard the condition of the finished-iron trade as being rather better than it has been hitherto this year, but I fear the change is on a most limited scale and does not offer a safe criterion of the general condition of the market. As a whole things are not better, and the outlook is very far from being a bright one. There is a vast amount of grumbling and a universal opinion that matters are worse than they have been at any former time within the memory of the present generation. Such business as is being done yields the barest possible margin of profit, and it often happens that orders are taken at a slight loss, or at all events without profit, simply to keep up a connection which may be useful in better times—if ever they reach this country. There is still much speculation as to the restrictions of production which are talked about in the pig iron and certain other branches of trade, but no progress has been made in the embodiment of these schemes, and there is a disinclination to take part in them which renders their success extremely problematical. The bigger firms do not see why they should prop up the smaller or weaker concerns to their own ultimate discomfiture, and they will not do more than mind their own business. In some instances this means a good deal more than meets the eye. In Bolckow-Vaughan's case, for instance, they can certainly produce rails against all comers, either for price or quality, and they are beginning to see that it might have been better for them to have played their own hand, instead of upholding sundry concerns who have old-fashioned plant and no great capital. William David & Co., of Garsheerie, are understood to take a similar view of pig iron. They can maintain their ground, and they will not be parties to any scheme which has for its object the propping up of competitors. In the galvanized-iron branch John Lysach, Limited (Bristol), will not "combine," and as that concern is now the largest producer its action effectually stops the proposed combination of the other makers. In other branches the same thing appears, and demonstrates the tendency of the times to let the "survival of the fittest" rule have full play. There is a good deal to be said on the other side, I am aware, but the arguments from that standpoint are somehow or other spoiled by the circumstance that there has never been a really successful "ring" among manufacturers in this country.

**FOREIGN COMPETITION**

is still a leading topic of conversation and newspaper writing here. It crops up very prominently in the new House of Commons, where there are questions almost every evening as to the amount and value of Government work now under execution abroad, prices paid, the reason why orders were not given out at home, and so on. In the city of London the Council has been petitioned to give instructions that none but English iron shall be used in the construction of the new bridge over the Thames below London Bridge. The Council managed to dodge the direct issue thus raised, but the object of the petitioners has been attained, inasmuch as the Bridge Committee of the Council has virtually determined to have no foreign iron or steel used for the new structure. At Sheffield the hubbub on using foreign goods and marking Sheffield brands on German articles is being continued. Elsewhere the "foreigner" constantly crops up and workmen are as constantly decrying the admission of foreign goods into this country. In higher and better-informed circles there is a seething discontent against the fiscal inequalities under which we carry on business, so that one may well make the inquiry as to what it all means and whither it will lead us. Does it indicate a stormy period during which Johnny Bull will repudiate the entire policy and works of Cobden?

**THE IRON MARKET**

has been dull throughout the week, and where prices have not fallen the greatest difficulty has been experienced in maintaining last week's quotations. At Glasgow the closing price was 38/. Business has been feeble, and it has been evidenced that there is little prospect of an improvement under the existing state of affairs. Shipments have continued poor, and stocks of necessity increased tolerably. At Middlesbrough last week's rates have been nominally maintained, although a trifle lower rates have been accepted. Shipments from Middlesbrough have also been again below the average. At Workington and district no improvement has been observed, and prices are as before, viz. 42/6 @ 43/ for mixed lots. At Barrow and in Lancashire generally the situation remains unaltered and without features, and the same remarks apply to

Staffordshire. For this latter district prices have stood throughout the week nominally at from 59 6 to 60/ for hot blast mine pig, 45/ @ 46/3 for part mine and 35/ @ 37/6 for cinder iron. In galvanized iron the lifeless character which has so long governed the trade still remains, and not a rift has been or is to be seen in the horizon. The attempts of the so-called Galvanized Makers' Association to organize a restriction of output has failed, so far as concerted action goes, but the principle sought to be demonstrated has, by sheer force of circumstances, been driven home to many of the makers, and upon their own responsibility they are working short time, and not a few very short time. German wire continues to hold its own, and the home makers report a condition little better than paralysis. In the finished-iron departments the utmost dullness prevails. Neither buyers nor sellers have shown the least disposition to contract for forward delivery, although for totally different reasons. Buyers declare that prices will go down yet further, while sellers affirm that bottom prices have been touched. Yet in spite of this dullness there are strikes and rumors of strikes, and against comparatively paltry reductions. The small amount of business doing is therefore disturbed. In Cleveland plates are quoted at 90/; angles, 87/6; bars, 92/6, f.o.b. at makers', less 2 1/2, and in Lancashire and Staffordshire prices nominally remain unchanged, but orders have been taken at rather lower rates. Scrap is in fair demand at about the same or perhaps a little easier rates. Freight rates remain steady for pig iron by ordinary steamer from Glasgow to New York, viz., 7/6. To the colonies there has been a reduction in the "ring" of the rates to 7/6 for an equivalent amount of tonnage placed on the berth by the opposition. Steel has been in fair request, but it is on their old contracts that the majority of firms are chiefly busy. This is especially the case with some of the leading firms—Bolckow, Vaughan & Co., Limited, and the Tredger Iron and Steel Co., Limited—who have adopted the manufacture of steel sleepers. The orders for bridges given out by the India Office have been divided among the Patent Shaft and Axletree Co., Limited, who have got nine spans; Hawks-Crawshaw & Co., 18 spans; Westwood & Bailey, nine spans, and Godwin & Co., eight spans. Steel rails have only been moderately inquired after, consequent upon the uncertainty which has prevailed as to the continuance or otherwise of the International Association, but among the inquiries are 1500 tons for the Waterford and Limerick Railway Co. and 3850 for the Bombay and Baroda Co. As to the Railways' Association, the meeting held on March 12 in London was not productive of anything definite, the upshot of it being an adjournment until April, when it is understood the final decision will be arrived at. The contract for 2400 tons of tramway rails required for the Melbourne Tramway Trust, which was taken a short time ago by McLean Brothers, Rize, has been placed with the Gesellschaft für Stahl-Industrie zu Bochum. The section is an extremely difficult one to roll, and there was little disposition shown by makers in England to take it in hand except at a non-competitive price.

**SCOTCH PIG IRON**

is dull, despite the efforts of the speculators to get a rise—out of the unwary public—on the strength of the suggested limitation of the output. In reality business is very quiet, both on shipping and consumptive account. There are 95 furnaces at work (an increase of two this last fortnight), against 92 a year ago. In Connal's stores there are 700,081 tons of pig iron (an addition of 5251 tons last week) as compared with 588,799 tons this date 1885. Shipments to date this year have been 61,653 tons, or 16,160 tons less than to same date last year. The importations of Middlesbrough pig iron into Scotland have been 60,502 tons, or 25,089 tons less this year to date. Current quotations:

Deliverable alongside.	No. 1	No. 2
Garsheerie, at Glasgow.....	48/	41/
Coltness, .....	47/	40/
Lanark, .....	44/6	42/
Summerlee, .....	47/6	42/
Calder, .....	47/	41/
Carnbroe, .....	48/	40/6
Clyde, .....	43/6	40/6
Monkland, .....	31/	39/
Quarter, .....	28/6	35/6
Govan, at Broomielaw.....	39/	35/
Shotts, at Leith.....	45/	41/6
Carron, at Grangemouth.....	48/6	45/6
Kinnell, at Boness.....	45/	42/6
Glenarnock, at Ardrossan.....	45/6	40/6
Eglinton, .....	39/	35/
Dalmellington, .....	41/6	38/6

Carron, No. 1 Selected, 56/ 3/4 ton, c.i.f. New York.

**MIDDLESBROUGH PIG IRON**

is dull as ever, and there is only a very limited turnover at the subjoined prices, which are for G.M.B., f.o.b. at makers' wharves in the Tees, net cash:

No. 1 Foundry.....	32/9	Mottled.....	29/9
" 2 ".....	31/9	White.....	29/9
" 3 ".....	30/3	Refined metal.....	47/
" 4 ".....	30/	Kentledge.....	33/6
" 4 Forge.....	29/6	Cinder.....	30/

**REMAITE PIG IRON**

is moderately steady, but quiet at about 42/6 @ 43/ for mixed lots in usual proportions, while West Coast makers' brands are:

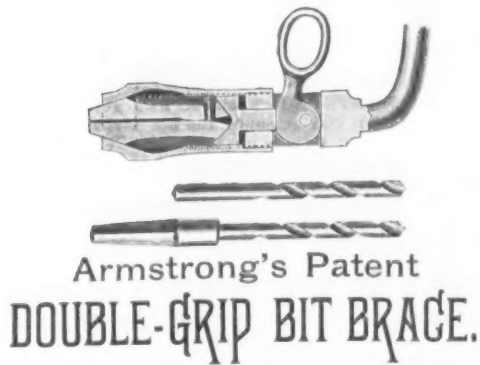
	No. 1.	No. 2.	No. 3.
Cleator.....	44/6	44/3	44/
Lonsdale.....	44/6	44/	43/6
West Cumberland.....	43/6	43/	42/6
Lowther.....	44/6	43/6	43/
Distington.....	43/6	43/	42/6
Solway.....	43/6	43/	42/6
Warrport.....	43/6	43/	42/6
Harrington.....	43/	44/	43/

Stocks in store only at Workington and Maryport are 103,377 tons, being 9210 tons more than at the beginning of the year. Shipments of pig iron from West Cumberland have increased by 14,815 tons this year, while steel rail shipments have decreased by 12,497 tons.

**THE HARDWARE TRADES.**

In London there is little, if any, indication that trade has received an impetus because of the opening of the London season, the cold weather doubtless retarding any beneficent current which fashion might create, and thus the hopes of an increased vitality in business are unfortunately not realized. The dry, sharp weather of the past few days has put the roads in good trim for cycling, and consequently there has been an in-





### Armstrong's Patent DOUBLE-GRIP BIT BRACE.

For Holding Round Shank Drills It has no equal.

Is the first Double-Grip Brace ever patented, and the claims are such that it controls all mechanism for getting a secondary grip on a bit or drill. It sells at sight, and every jobber and retail store will handle it and discard all ordinary bit braces. In operating this brace the shell is screwed down, as in all ordinary bit braces, then the cam lever is drawn up and closes the jaws firm on the under side, and gets a tremendous power from the cam lever. It is made from highly polished steel and nickel plated; the jaws are forged steel and hardened; the shell which bears on the jaws is also case-hardened, so as to prevent wear on jaws or shell. Every part is made of the best material and workmanship, and guaranteed to give satisfaction. We want one good jobbing house in every city to handle these goods, who are willing to push it. We also make a line of Ratchet Braces with this attachment. For further particulars, prices and discount, address

The Upson & Hart Co.,  
Sole Manufacturers,  
UNIONVILLE, - - CONN.

Price per Single Brace ..... \$2.50  
With Ratchet.....3.00  
Good reliable agents wanted. Territory  
given to the right party.

### CRONK'S

## Wrought Iron Barn Door Hanger

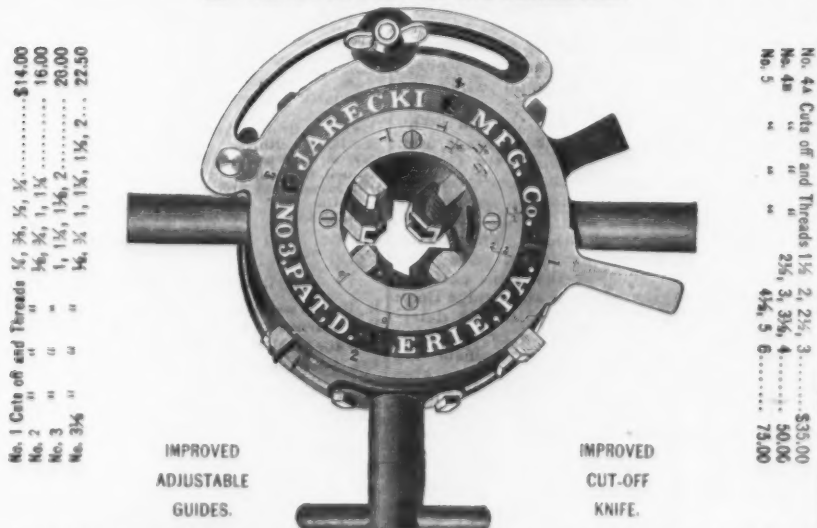
AND  
Stay Roller.



CRONK HANGER COMPANY  
ELMIRA, NEW YORK.

## Jarecki's Screw Plate and Pipe Cutter.

WRITE FOR DISCOUNT AND DESCRIPTION.



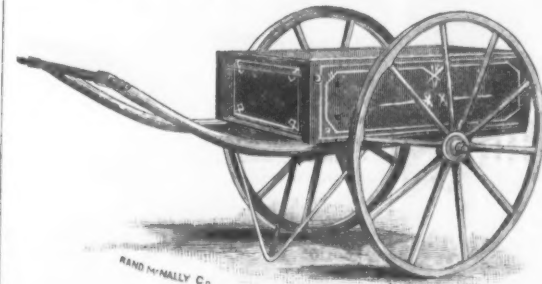
JARECKI MFG. CO., ERIE, PA.,  
Manufacturers of Malleable and Cast Iron Pipe Fittings, Brass and Iron Valves and Cocks  
for Steam, Gas, Water and Oil; Pumps, Machinery and Supplies for Artesian  
Wells. Illustrated Catalogue on application.



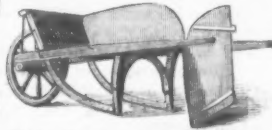
CANTON HOE & TOOL CO.,  
CANTON, OHIO, U. S. A.

## LANSING WHEELBARROW CO.,

Lansing, Mich.



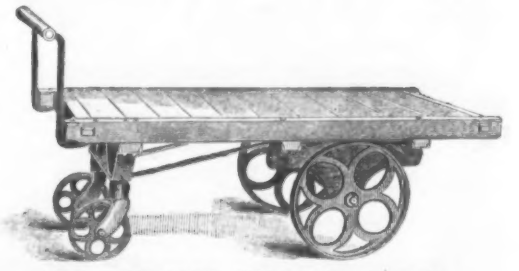
HAND CART.



Globe Patent Garden Barrow.



Capitol Patent Bolted Barrow.



THE REYNOLDS IMPROVED TRUCK.

Front Wheels Casters. Truck turns in its own length. Runs on or off elevator or scales at any angle. Is easily dumped by lifting handle. Any size. Send for circular.

SEND FOR CATALOGUE.



## Peavies & Pike Poles

For River Driving.

Cant Hooks for Mill and Woods Use.  
Hand Spikes, Setting Poles, Skidding  
Tongs and Swamp Hooks.

Best Steel Boat Calks and Sets.

Largest Manufacturers of Shingle Bands.  
Capacity, 3 Tons per Day.

"BLUE LINE" LUMBERING TOOLS.

MANUFACTURED BY

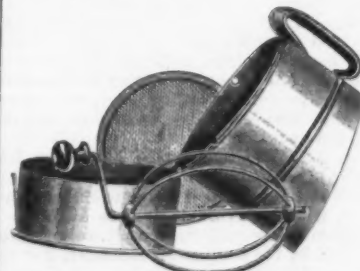
## MORLEY BROTHERS, EAST SAGINAW, MICH.

### HENRY FOUR-PIECE SIFTER,

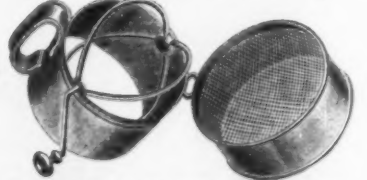
MANUFACTURED BY THE

Straubinger Sifter Mfg. Co.,

LA FAYETTE, IND.



Agitator and Sieve Removed for Cleaning.



New Sieve can be had from the Manufacturers.

The only Sifter in the World from which  
the Sieve can be removed for clean-  
ing or renewing.

LICENSED BY

THE HUNTER SIFTER MFG. CO.

Write to the Manufacturers for Circulars,  
Prices and Discounts.  
And for sale by all Jobbers of Hardware and  
Tinners' Stock.

Mixer, Measurer, Weigher, Scoop,  
Egg Beater, Rice Washer,  
Starch, Wine and  
Fruit Strainer.

## ROCK and ORE BREAKERS and CRUSHERS.

(The Blake Style.)

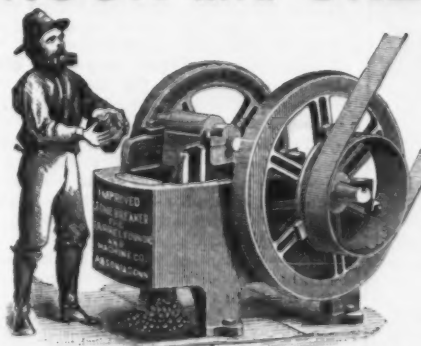
This style of Rock Breaker, after 15 years' practical test at HOME and ABROAD, has proved to be the best ever designed for the purpose of breaking all kinds of hard and brittle substances, such as  
**Quartz, Emery, Gold and Silver Ores, Coal, Plaster,  
Iron, Copper, Tin and Lead Ores.**

ALSO FOR MAKING

**RAILROAD BALLAST AND CONCRETE.**

Mr. S. L. MARSDEN, who for the past 20 years has been connected with the manufacture of the  
"Blake Crusher," superintends the making of the machine.  
Gold Medal awarded at the Massachusetts Mechanic Association, 1881, and Silver Medal  
(Special) at American Institute, New York, 1882. Address

**FARREL FOUNDRY AND MACHINE CO.,  
ANSONIA, CONN.**



Amidon's Corner Brace.  
WE MANUFACTURE  
8 Different Styles  
BIT BRACES.

Our BARKER BRACE is made in 4  
grades, and our RATCHET BRACE  
in 3 grades, the cheapest finish being just as sub-  
stantial as the best. Send for Catalogue.

AMIDON & WHITE,  
135 & 137 Main St., through to 10, 12 & 14 Quay St.  
BUFFALO, N. Y.

Palmer's Common Sense  
FRAME PULLEY.

Saves the User 50 Cts. Per Doz.  
Mortising all done with a bit.  
No chisels or other tools re-  
quired.  
By hand—eight to one.  
By power—twelve to one.  
The only Frame Pulley the  
Trade can handle with profit.  
The only Pulley users will buy  
after seeing this.  
Send for Circulars.

MANUFACTURED BY  
Palmer Mfg. Co., Troy, N. Y.  
Sole Eastern Agents,  
PEABODY & PARKS, Troy, N. Y.

## HARRINGTON & RICHARDSON'S New Model Shell-Ejecting Double-Action Revolver.

32 AND 38 CALIBER.



MANUFACTURED BY  
Harrington & Richardson, Worcester, Mass.

TOWER & LAMONT,

MANUFACTURERS OF RAZOR STROPS, Rochester, N. Y.



The LAMONT is the  
original Combination  
STROP and the Stand-  
ard. It positively has  
no equal. If your job-  
ber does not have it,  
send to us. Belt of Rus-  
sian leather.



**LOOK AT THESE BOTTLES**  
and see which you had rather have—the big "10-cent bottle" with 5 cents' worth of glue, or the honest bottle with

**DOUBLE THE QUANTITY, AND BETTER QUALITY.**

This is an exact reproduction of a bottle of glue extensively advertised as a "10-cent article."

**IT IS NOT LePAGE'S.**

**LEPAGE'S LIQUID GLUE**  
bottle,—outside and inside.

**YOU GET THIS BOTTLE FULL WHEN YOU BUY LePAGE'S.**

**GLUE GLASS**

THE TOTAL QUANTITY of LePAGE'S LIQUID GLUE sold during the past five years in all parts of the world amounted to over **32 MILLION** Bottles. Everybody wants it.

**ALL KINDS of DEALERS find it a good thing to handle. It brings new customers, and makes the old ones STICK.**

**TWO GOLD MEDALS**  
London, 1883; New Orleans, 1885. At the New Orleans Exposition joints made with it endured a testing strain of over **1600 POUNDS TO A SQUARE INCH.** Pronounced the Strongest Glue Known. IT MENDS EVERYTHING, Wood, Leather, Paper, Ivory, Glass, China, Furniture, Bric-a-Brac, etc. **STRONG AS IRON. SOLID AS A ROCK.** Indispensable in every household.

If your dealer does not keep it, send his card with five 2-cent stamps for sample by mail.  
**RUSSIA CEMENT CO., Gloucester, Mass.**

**LOOK AT THESE BOTTLES**  
and see which you had rather have—the big "10-cent bottle" with 5 cents' worth of glue, or the honest bottle with

**DOUBLE THE QUANTITY, AND BETTER QUALITY.**

This is an exact reproduction of a bottle of glue extensively advertised as a "10-cent article."

**IT IS NOT LePAGE'S.**

**LEPAGE'S LIQUID GLUE**  
bottle,—outside and inside.

**YOU GET THIS BOTTLE FULL WHEN YOU BUY LePAGE'S.**

**GLUE GLASS**

THE TOTAL QUANTITY of LePAGE'S LIQUID GLUE sold during the past five years in all parts of the world amounted to over **32 MILLION** Bottles. Everybody wants it.

**ALL KINDS of DEALERS find it a good thing to handle. It brings new customers, and makes the old ones STICK.**

**TWO GOLD MEDALS**  
London, 1883; New Orleans, 1885. At the New Orleans Exposition joints made with it endured a testing strain of over **1600 POUNDS TO A SQUARE INCH.** Pronounced the Strongest Glue Known. IT MENDS EVERYTHING, Wood, Leather, Paper, Ivory, Glass, China, Furniture, Bric-a-Brac, etc. **STRONG AS IRON. SOLID AS A ROCK.** Indispensable in every household.

If your dealer does not keep it, send his card with five 2-cent stamps for sample by mail.  
**RUSSIA CEMENT CO., Gloucester, Mass.**

creased inquiry for machines, and considering the time of year a fair share of business has been done. J. G. Rollins & Co., Old Swan Wharf, E. C. have made a feature of Batcheller's crucible cast steel hay, manure and digging forks. The firm make a specialty of American goods, axe, pick, hammer and hatchet handles, holding an important place among every-day requirements. An American bay-knife, styled The Lightning, is said to be much esteemed; it has a serrated edge, and may be used by a person in an erect position without the necessity of stooping. It is declared that a cut of 2 feet deep and to feet in length can be easily made in one minute. Spring blind rollers, meat choppers, egg-beaters, woodware and household requisites of every design are present in great variety, and as in former seasons the Archimedean American lawn mower occupies a prominent position. At Birmingham it is clear that business is improving somewhere, and every one lives in hope that the improvement will soon make itself generally felt. The home trade is still adversely affected by the unparalleled prolongation and severity of the weather, but that is a misfortune which a change in the wind may remedy at any moment, and when the spring trade is fairly started it may be expected to move with a rush. Meanwhile there is a considerable and growing volume of business under execution which a slight upward move in prices would suffice to make remunerative, and there are inquiries about from railway companies as well as from the Admiralty and War departments for supplies of various kinds, which promise good results by and by. Tramway enterprise at home and abroad continues active, and the approach of the spring cleaning period is creating a demand for various kinds of furnishing ironmongery and brassware. At Sheffield the orders for outdoor tools are much in arrears, and country business generally has sustained a check which is scarcely likely to be made up later on in the season. Makers of hot-air stoves, heating apparatus, skates, &c., profit by hard weather in its place, but at this period of the year they derive no benefit whatever. In many parts of the country the business of ironmongers and other retail dealers is reported as having been seriously affected by the difficulty of communication with the rural districts, while farming operations have been practically suspended. The London trade, on the other hand, evinces a more active tendency, and some excellent orders have been received during the last week or two by leading houses in the cutlery and silver trades. In the export departments the chief elements of discouragement still come from the colonies and America. Tools and cutlery are in improving request for Australia, though the sheep-shear orders remain, for reasons already adduced, a good deal below the average. Some good lines for sheep shears have, however, been lately received from Canada by one local firm, and the general demand from the Dominion for Sheffield goods is much better than it has been for at least 12 months. The steel houses which supply the New York buyers with high-class crucible brands are also busier than they have been for a considerable period.

**YOU CAN'T AFFORD TO LET YOUR CUSTOMERS GO TO ANOTHER STORE FOR WHAT THEY WANT WHEN YOU CAN SELL IT YOURSELF AND MAKE MONEY ON IT.**

**ASK JOBBERS FOR IT OR SEND FOR PRICE LIST AND SAMPLE CAN FREE.**

**THE STRONGEST GLUE IN THE WORLD.**

**TWO GOLD MEDALS**  
LONDON 1883 NEW ORLEANS 1885.

**LEPAGE'S LIQUID GLUE**  
CONTAINS NO ACID. MANUFACTURED BY THE RUSSIA CEMENT CO. FOR SALE EVERYWHERE.

**MENDS EVERYTHING.**  
GLASS, CHINA, LEATHER, BOOKS, FURNITURE, STRONG AS IRON. SOLID AS A ROCK. SEND CARD OF DEALER WHO DOES NOT KEEP IT & 10c. POSTAGE FOR SAMPLE TIN CAN FREE.

**IT IS UNEQUALLED. TRY IT.**

**LOOK AT THESE BOTTLES**  
and see which you had rather have—the big "10-cent bottle" with 5 cents' worth of glue, or the honest bottle with

**DOUBLE THE QUANTITY, AND BETTER QUALITY.**

This is an exact reproduction of a bottle of glue extensively advertised as a "10-cent article."

**IT IS NOT LePAGE'S.**

**LEPAGE'S LIQUID GLUE**  
bottle,—outside and inside.

**YOU GET THIS BOTTLE FULL WHEN YOU BUY LePAGE'S.**

**GLUE GLASS**

THE TOTAL QUANTITY of LePAGE'S LIQUID GLUE sold during the past five years in all parts of the world amounted to over **32 MILLION** Bottles. Everybody wants it.

**ALL KINDS of DEALERS find it a good thing to handle. It brings new customers, and makes the old ones STICK.**

**TWO GOLD MEDALS**  
London, 1883; New Orleans, 1885. At the New Orleans Exposition joints made with it endured a testing strain of over **1600 POUNDS TO A SQUARE INCH.** Pronounced the Strongest Glue Known. IT MENDS EVERYTHING, Wood, Leather, Paper, Ivory, Glass, China, Furniture, Bric-a-Brac, etc. **STRONG AS IRON. SOLID AS A ROCK.** Indispensable in every household.

If your dealer does not keep it, send his card with five 2-cent stamps for sample by mail.  
**RUSSIA CEMENT CO., Gloucester, Mass.**

**LOOK AT THESE BOTTLES**  
and see which you had rather have—the big "10-cent bottle" with 5 cents' worth of glue, or the honest bottle with

**DOUBLE THE QUANTITY, AND BETTER QUALITY.**

This is an exact reproduction of a bottle of glue extensively advertised as a "10-cent article."

**IT IS NOT LePAGE'S.**

**LEPAGE'S LIQUID GLUE**  
bottle,—outside and inside.

**YOU GET THIS BOTTLE FULL WHEN YOU BUY LePAGE'S.**

**GLUE GLASS**

THE TOTAL QUANTITY of LePAGE'S LIQUID GLUE sold during the past five years in all parts of the world amounted to over **32 MILLION** Bottles. Everybody wants it.

**ALL KINDS of DEALERS find it a good thing to handle. It brings new customers, and makes the old ones STICK.**

**TWO GOLD MEDALS**  
London, 1883; New Orleans, 1885. At the New Orleans Exposition joints made with it endured a testing strain of over **1600 POUNDS TO A SQUARE INCH.** Pronounced the Strongest Glue Known. IT MENDS EVERYTHING, Wood, Leather, Paper, Ivory, Glass, China, Furniture, Bric-a-Brac, etc. **STRONG AS IRON. SOLID AS A ROCK.** Indispensable in every household.

If your dealer does not keep it, send his card with five 2-cent stamps for sample by mail.  
**RUSSIA CEMENT CO., Gloucester, Mass.**

**TIN PLATES.**

In London it is not easy to clearly indicate the exact position of the tin-plate market at the present time. There are again ugly rumors about as to the position of some of the makers and as regards business that does not appear to be brisk. The leading works are probably well off for orders, but it is very doubtful whether the same remark holds good as regards the majority of firms. But the chief factor in the present uncertainty is the serious drop of 10/3 ton in the price of Bessemer steel bars which was announced at the end of last week. This action has been taken by the producers, I believe, on several grounds. They hope to arrest further progress in the direction of Belgian competition, to stop the erection of new furnaces which it is understood were in contemplation, and at the same time they hope the reduction will suffice to give the death-blow to the production of coke plates. Buyers of tin plates have been trying to place orders during the week at prices based on the reduction in bars, but makers have not met their offers and I cannot quote IC cokes below 13/3 @ 13/6, f.o.b. Liverpool. At Liverpool the local tin-plate market has taken a sudden change for the worse. The demand during the most part of last week was pretty fair and quotations were maintained up to a certain point, orders being repeatedly refused at buyers' limits by many sellers. The quotations were then 13/9 @ 14 IC for ordinary kinds of coke tins and Bessemer steels, and 20/ for IC, to 20/8, for which there were a great many inquiries. But suddenly at the close of the week it became known that some makers of Bessemer bars intended reducing their prices by 10/3 ton, and when official intimation of this was received on Saturday there was something like a panic among those makers of tin plates who were in want of orders and who were then only too anxious to secure the orders they had previously refused at a reduction of 15d. @ 3d. This reduction in the price of Bessemer bars was really sprung upon them quite unawares, and they were in a manner nonplused. Orders for ordinary kinds of coke tins would now be accepted at 13/6 IC if they were to be had, but they are not; and Bessemer in 14 x 20 at 13/9, as well as 10 x 20 at 10/7. The reduction in the price of Bessemer bars has been brought about, it is supposed, partly by the keen competition of the Belgian makers of Bessemer bars and also by the reduction in wages which is contemplated in the South Wales puddling forges. Though the price of Siemens bars has not been officially reduced as yet, it is, however, thought that they must follow the Bessemer makers. Previous to this there were orders still to be had for Siemens steel plates with coke finish at 14/3 @ 14/6 IC, but all this business is in suspense now until things have settled down a little. There are still inquiries for charcoal tins and ternes, but not many orders backed, excepting at reduced figures. The former in ordinary kinds are as low as 12s. and up to 16/6 @ 17/6 for best sorts, while the latter are 13/6 @ 14/6 IC. Coke tin wasters are in fair demand at 12/6.

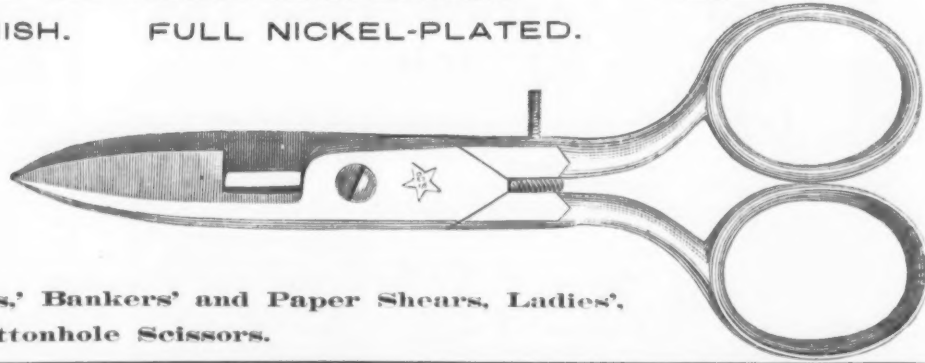
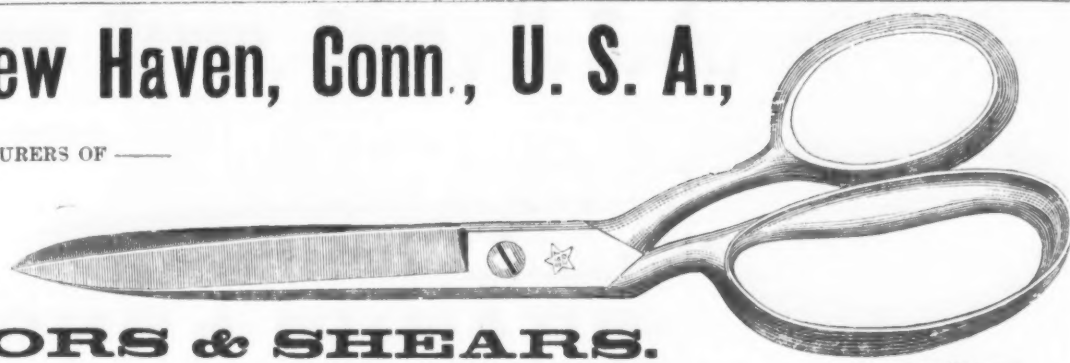


# Wm. Schollhorn & Co., New Haven, Conn., U. S. A.,

MANUFACTURERS OF

## THE STAR SCISSORS & SHEARS.

WARRANTED SUPERIOR QUALITY. CROCUS FINISH. FULL NICKEL-PLATED.



Full Line of Straight and Bent Trimmers, Barbers' Bankers' and Paper Shears, Ladies', Embroidery, Pocket and Buttonhole Scissors.

# CHAPMAN VALVE MANUFACTURING COMPANY,

MANUFACTURERS OF

## Valves and Gates

FOR

STEAM, WATER, GAS, AMMONIA.

## GATE FIRE HYDRANTS,

With and Without Independent Nozzle Valves.

All Valves and Hydrants made with Babbitt Metal Seats and non-corrosive working parts.

ALL WORK GUARANTEED.

Send for Price List.

Works and General Office:

INDIAN ORCHARD, MASS.

Treasurer's Office:

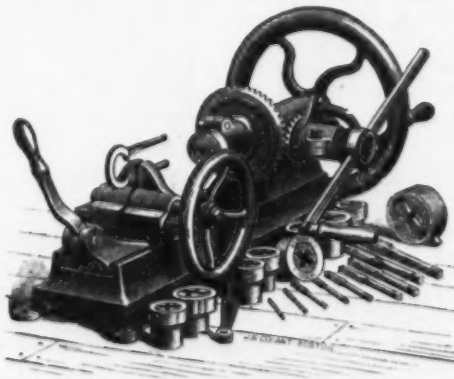
72 Kilby and 112 Milk Sts., BOSTON, MASS.



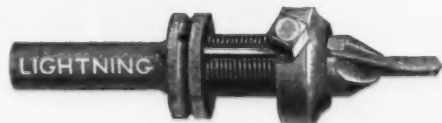
# WILEY & RUSSELL MFG. CO., GREENFIELD, MASS.

MANUFACTURERS OF THE

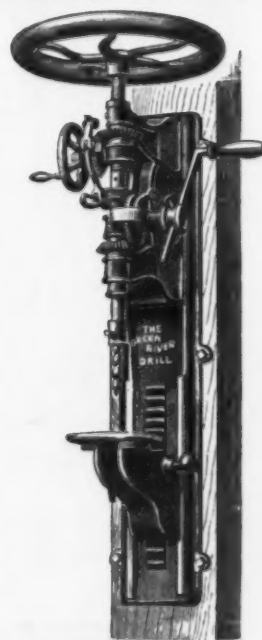
## LIGHTNING and GREEN RIVER MACHINERY and TOOLS.



No. 20. FOR BENCH.



LIGHTNING.



Green River Drill.

SEND FOR 1886 LIST, JUST OUT.

"BUFFALO CHAMPION"

## ICE + CREAM + FREEZERS.

Four Styles.

Sixteen Sizes.

We introduced these Freezers in 1873 Confectioners, Hotels, Restaurants and Families have thoroughly tested and approved them. *The best Freezers made.*

For Illustrated and Descriptive Price Lists, address the Sole Manufacturers,

Sidney Shepard &amp; Co.,

BUFFALO, N. Y.,

OR

C. SIDNEY SHEPARD &amp; CO.,

Chicago, Ill.



## HERRICK & COWELL, Patent Lever Drills

WITH One to Six Spindles.

WARRANTED EQUAL TO ANY

DRILLS

ON THE MARKET

FOR Manufacturing Purposes.

Send for Catalogue.

Herrick &amp; Cowell, 37 ARTISAN ST., NEW HAVEN, CONN.

SCREW DRIVERS

OF ALL KINDS

A SPECIALTY.

Send for Catalogue and Full List.

THE ELLRICH HARDWARE MANUFACTURING CO., HARDWARE SPECIALTIES, Plantsville, Conn.



## The HUGUNIN, IMPROVED, ADJUSTABLE, SASH BALANCES;

HAVING LATE PATENTED IMPROVEMENTS.



3 Sizes: No. 1, 1 1/4 in. wide; 30 lb. Sash and under. MALLEABLE AND GRAY IRON. No. 2, 1 1/2 in. wide; 40 lb. No. 3, 1 3/4 in. wide; 50 lb.

The Improved goods have been made and sold the past four years, with satisfaction to the dealer and user; proven by increasing orders from the best trade. The principle and mechanism of these goods meet the approval of those competent to judge them. They notably balance sash by an unlimited and cheap power—uniformly controlled friction—regulated to the weight of the sash by a patented adjusting screw, with a surplus power in reserve, available by further drawing the adjusting screw, without removing the balances or sash. The balances will give permanent satisfaction if applied according to the simple, illustrated directions sent with the goods. All genuine Improved Hugunin Balances have "Robt. H. Hugunin, Inventor and Sole Authorized Maker" cast directly on the face of the goods. Reject all others as fraudulent imitations, and save future trouble. My old unimproved style has been fraudulently copied, using the date of one of my minor patents, Nov. 6, 1877—never used on the genuine goods—the cooler having no patent—and sold through all dealers, to the great injury and loss of the buyer. I have constant letters of complaint, and advise all who have been swindled to keep their evidence till suit may be brought, and send unrecalled, 1877 style, at half price. No clock springs to rust out and set; no combination clasp to get your money, but full y warranted goods. Simple, durable, efficient, cheap. For sale by the best trade everywhere. Goods delivered in New York free. Address orders, &c.,

ROBT. H. HUGUNIN, Hartford, Conn.

## THE INTERNATIONAL RESOLVENT.

The Concentrate Tannin Antidote to Scale and Foam in Steam Boilers.

Recognized by the highest authorities as the true and silent Solvent and Preventive. Free from every objection. In bulk from extensive works at source of supply. More of the active principle for the cost than possible in any other. Full guarantee to remove ALL scale and to prevent foam in any boiler with any water. Purely vegetable and harmless.

SEND FOR CATALOGUE AND PRICES TO

INTERNATIONAL MFG. CO., 272 Pearl St., Cleveland, Ohio.

15 Wabash Ave., Chicago, Ill.

96 Fifth Ave., Pittsburgh, Pa.

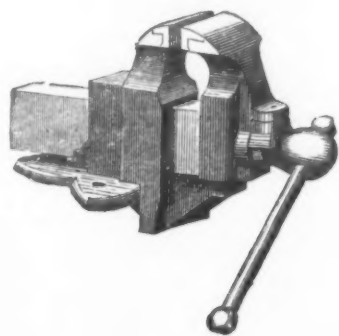
J. W. Swann, Dallas, Tex.



# HOWARD IRON WORKS,

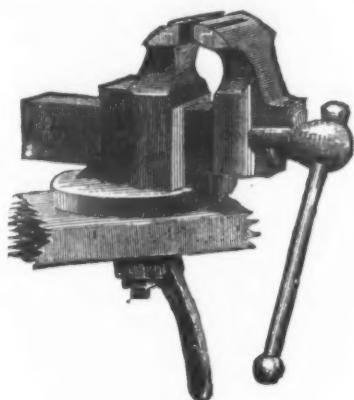
— BUFFALO, N. Y. —

## BENCH VISES.



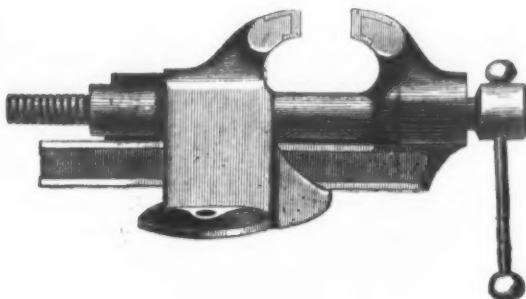
HOWARD PARALLEL BENCH VISE.  
FIXED.

No. 0,	Length of Jaw, 3	in., weight	25 1-2 lbs	.....\$5.50
" 1,	" "	3 1-2 "	" 31 1-2 "	6.50
" 2,	" "	4 "	" 41 "	8.50
" 3,	" "	4 1-2 "	" 52 1-2 "	10.75
" 4,	" "	5 "	" 93 "	16.00
" 5,	" "	6 "	" 113 1-2 "	23.75
" 6,	" "	7 "	" 184 "	34.50



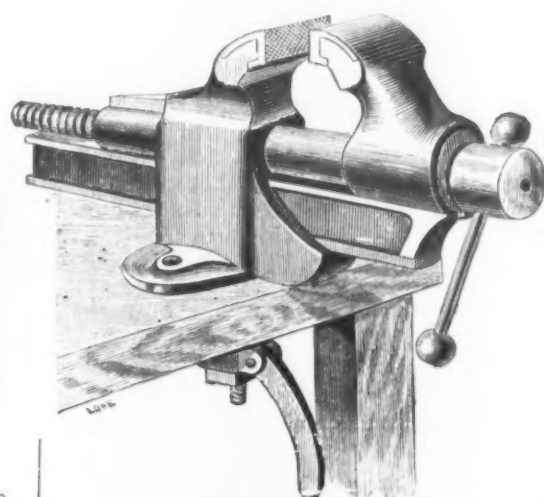
HOWARD PARALLEL BENCH VISE.  
SWIVEL.

No. 00,	Length of Jaw, 2	in., weight	7 1-2 lbs	.....\$4.00
" 0,	" "	3 "	" 31 1-2 "	6.25
" 1,	" "	3 1-2 "	" 38 1-2 "	8.00
" 2,	" "	4 "	" 48 "	10.00
" 3,	" "	4 1-2 "	" 61 "	13.25
" 4,	" "	5 "	" 104 1-2 "	18.50
" 5,	" "	6 "	" 129 "	26.00
" 6,	" "	7 "	" 194 "	36.00



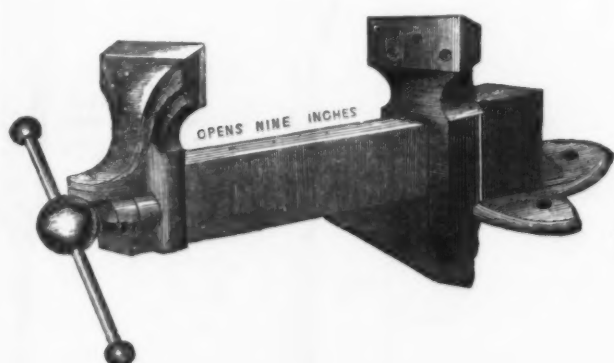
HOWARD PARALLEL BENCH VISE.  
FIXED.

No. 20,	2	inch Jaw	.....\$4.00
" 25,	2 1-2 "	"	5.00
" 30,	3 "	"	6.25
" 35,	3 1-2 "	"	7.00
" 40,	4 "	"	9.00
" 45,	4 1-2 "	"	11.75
" 50,	5 "	"	16.25
" 55,	5 1-2 "	"	20.00



HOWARD PARALLEL BENCH VISE.  
SWIVEL.

No. 20,	2	inch Jaw	.....\$4.50
" 25,	2 1-2 "	"	5.75
" 30,	3 "	"	7.00
" 35,	3 1-2 "	"	8.25
" 40,	4 "	"	10.75
" 45,	4 1-2 "	"	14.00
" 50,	5 "	"	19.25
" 55,	5 1-2 "	"	23.50



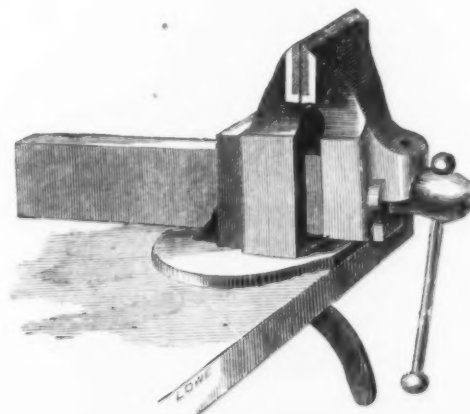
HOWARD COACH MAKER'S VISE.  
FIXED.

No. 2, Length of Jaw, 4 in.; weight, 37 1/2 lbs .....\$10

THE "Vises" manufactured by the Howard Iron Works are noted for their great **STRENGTH, DURABILITY AND THEIR EXCELLENT CONSTRUCTION.** The malleable cast-iron nut of the vise is rendered immovable by being set in molten iron, thereby doubling the durability of both nut and screw, for they are saved from the destructive grinding, cutting and binding action of the cross-strain, which has always been a great evil heretofore.

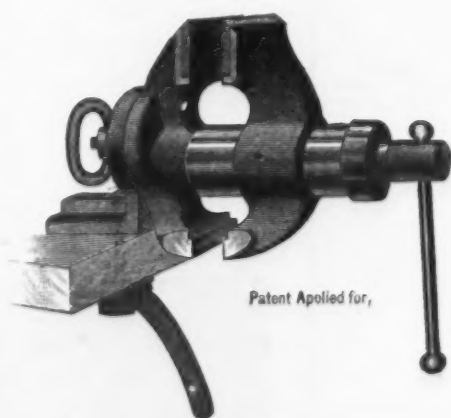
Another improvement is the chilling of those parts of the slide sheath that come in contact with the slide, thereby avoiding much friction in its movement.

Many additional and important improvements have also been made in our "Swivel Vise." There is great strength in its circular base, so that its side parts may be employed for light anvil uses. The vise is held fast to the bench by a very simple cam arrangement, holding it so firmly that the combined force of several men exerted upon the vise cannot move it from position, and yet so convenient is the arrangement that this great power is instantly removed and applied. The seat of the swivel is slightly concave, so that it shall rest upon the circumference of its base.



HOWARD COACH MAKER'S VISE.  
SWIVEL.

No. 1, Length of Jaw, 4 inches .....\$12.50

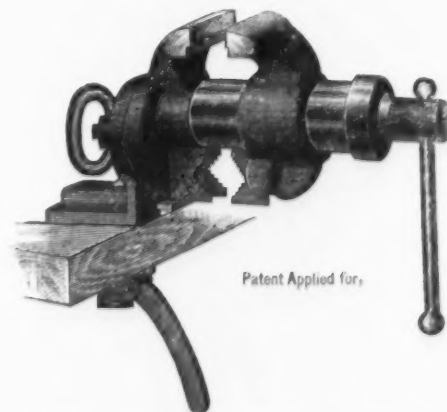


UNIVERSAL COMBINATION WHEELWRIGHT AND  
METAL WORKERS' VISE.

Length of Jaw, 4 1/2 in.; opens 4 1/4 in.; weight, 83 lbs. ....\$15.00

### UNIVERSAL COMBINATION VISES.

These Vises are very handy mechanical appliances for general use, as they combine two different and separate vises in one. They are made very strong, and will swivel in any direction. The "Combination Pipe and Metal Workers' Vise," for instance, will be found a very useful and practical instrument in every engine room, as the engineer, with the aid of a few pipe tongs and die plates, can in most cases do all the small repairing and fitting of pipes, &c., himself.



UNIVERSAL COMBINATION PIPE AND METAL  
WORKERS' VISE.

Length of Jaw, 4 1/2 in.; opens 4 1/4 in., and will take from 3/8 in. diameter to 3 in. pipe; weight, 80 lbs. ....\$15.00  
3-in. Jaw, opens 4 1/4 in., and will take from 3/8 in. to 2 in. diameter pipe; weight, 52 lbs. ....\$12.00

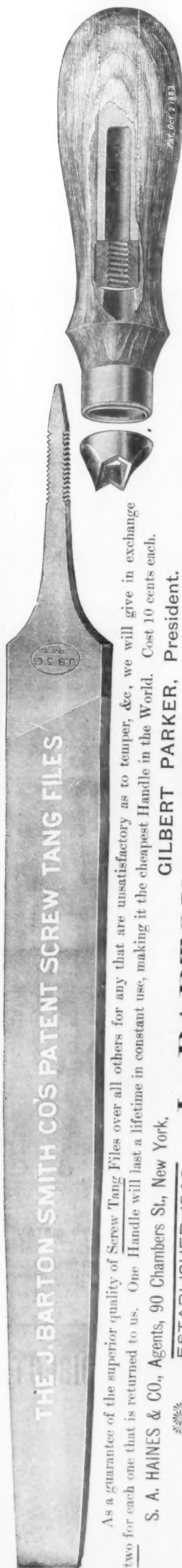
IF YOUR HARDWARE DEALER HAS NOT THESE VISES SEND TO US DIRECT.

Liberal Discount to the Trade. Orders Solicited.

HOWARD IRON WORKS,

BUFFALO, N. Y.





As a guarantee of the superior quality of Screw Tang Files over all others for any that are unsatisfactory as to temper, &c., we will give in exchange two for each one that is returned to us. One Handle will last a lifetime in constant use, making it the cheapest Handle in the World. Cost 10 cents each.

S. A. HAINES & CO., Agents, 90 Chambers St., New York.

**J. BARTON SMITH COMPANY,**  
ESTABLISHED 1842.

PHILADELPHIA, PA., U. S. A.

## D. SAUNDERS' SONS,

MANUFACTURERS OF

Pipe Cutting and Threading Machines

For Pipe, Mill and Steam Fitters' Use.

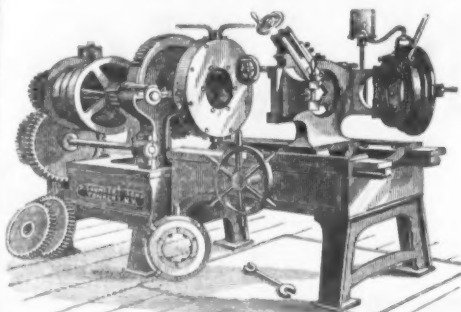
Tapping Machines

For Steam Fitting. Also

STEAM AND GAS FITTERS HAND TOOLS,

No. 25 Atherton Street,

YONKERS, N. Y.



SEND FOR CIRCULARS.

## SHIELDS & BROWN,

78 and 80 Lake St., CHICAGO, ILL.

143 Worth St., NEW YORK.

MANUFACTURERS AND SOLE PROPRIETORS OF

FOR BOILERS AND STEAM PIPES.



Awarded first and only Prize, Silver Medal, at the late National Railway Exposition.

Send for Illustrated Pamphlet, and mention The Iron Age.

FOR GAS AND WATER PIPES

Prevents Sweating and Freezing.

Double Acting Spring

# BUTTS

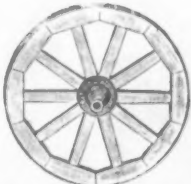
SABIN'S LEVER DOOR SPRINGS, Coil, and Sabin's Volute Springs For various purposes made to order.

SABIN MACHINE CO., Montpelier, Vt.

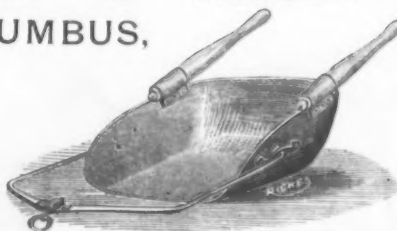
## THE KILBOURNE & JACOBS MFG. COMPANY,

COLUMBUS,

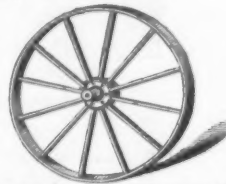
OHIO, U. S. A.



Jacobs' Patent Wood Wheel.



"Columbus" Solid Steel Scrapers.



Jacobs' Patent Steel Spoke Wheel

is pressed from one solid sheet of heavy steel, and is the strongest and most durable Road Scraper made. We make three sizes of these Scrapers. No. 1, Capacity, 7 cubic feet of earth. No. 2, 5 cubic feet of earth. No. 3, 3 1/2 cubic feet of earth. Furnished with or without solid steel shoes or runners, as desired. We also furnish these Scrapers with end gates when so desired. The balls are of refined iron, with strong and perfect working swivels. Bowls nest and handles crate compactly for shipment.



RAILROAD OR CANAL BARROW.

With Jacobs' Patent Wood Wheel. Bent Tray, full sized planed and well finished.



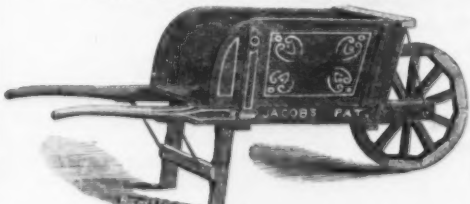
RAILROAD OR CANAL BARROW.

Same as above, except with Jacobs' Patent Steel Spoke Wheel.



ORE OR MORTAR BARROW.

With Jacobs' Patent Wood Wheel. All hardwood. Bowl dovetailed together and firmly nailed.



GARDEN OR FARM BARROW.

Set Up. Double Frames and so constructed that by simply removing one bolt (the axle) and two nuts they can be folded flat down (see cut) and shipped at lowest rate of freight. Three sizes.



Folded for Shipping.

We Also Manufacture BRICK TRUCKS,

BRICK WAGONS,

Store and Warehouse TRUCKS, Both Boston and Western Pattern.

Also, SPECIAL TRUCKS of every kind.

Baggage Barrows, Express Wagons, &c., &c.

Also, ROAD LEVELERS, GRADERS, EXCAVATORS, &c. &c.

Wrought Steel Sinks.



"COLUMBUS" Solid Steel Tray Barrows.

No. 1, capacity 3 1/2 cu. ft., Jacobs' Patent Steel Spoke Wheel.

No. 2, capacity 5 cu. ft., Jacobs' Patent Steel Spoke Wheel.



OPEN BOTTOM BRICK BARROW.

With Jacobs' Patent Wood Wheel. Folds for shipping, same as Garden or Farm Barrow.



STRAIGHT HANDLE STONE BARROW.

With Jacobs' Patent Wheel. Strong, well-made, iron strapped over bottom and bolted together. For stone or pig iron, &c.



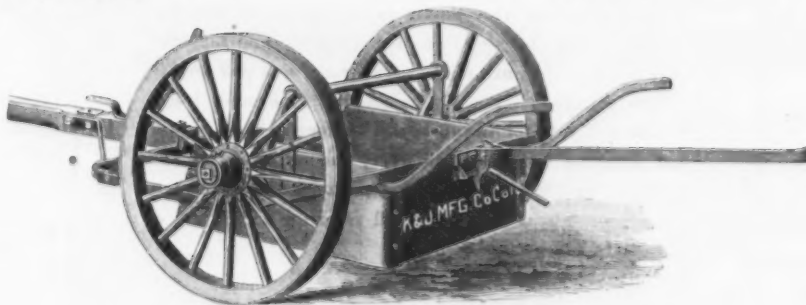
BENT HANDLE STONE BARROW.

With Jacobs' Patent Wheel. 17 1/2 inch tire. Well ironed and bolted. Extra strong.



STEEL BOTTOM STONE BARROW.

Bottom and Dash formed of one plate of Steel one-fourth of an inch thick. Steel Spoke Wheel. The strongest and best Stone Barrow manufactured. Very durable.



THE "K. & J." WHEEL SCRAPER.

The Bowl or Box is made of the Best Steel Plate, 3-16ths of an inch thick. The Tongue Braces or Bail Lever and Hangers are all of Steel. Seven patent wheels. These Scrapers have no wood parts to rot or castings to break, no ratchets to clog up, and fewer nuts to come off and parts to get out of order than any other Wheel Scraper. They are so constructed that the team does most of the lifting, and One Man can fill, raise and dump the largest size with ease. They are so hung that there is absolutely NO STRAIN WHATSOEVER ON THE HORSES' NECKS.

No. 2, Capacity 12 cubic feet. No. 3, Capacity 16 cubic feet.

## THE "PERFECTED" LEMON SQUEEZER,

WITH Knife for Cutting the Lemon.

Made of Best Malleable Iron and heavily tinned in the best manner.

SEND FOR PRICES.

THE ACME SHEAR CO., Bridgeport, Ct.



## EUREKA!

OLSON'S PATENT

## SPIRAL SCREW DRIVER



The most wonderful labor-saving Tool ever known. An entire revolution in driving Screws.

A Perfect Novelty.

What the Mechanics say:

"Two-thirds of the time saved. I can not afford to do without it. It will drive a screw into wood, soft or hard in one-third of the time of any other mode in use."

Put oil in hole on the side before using

Made in two sizes, Length of large one extended, 19 inches, closed 12 inches.

Small one, opened 14 inches, closed 9 inches. Blades 1-4 and 5-16 in.

SOLD BY

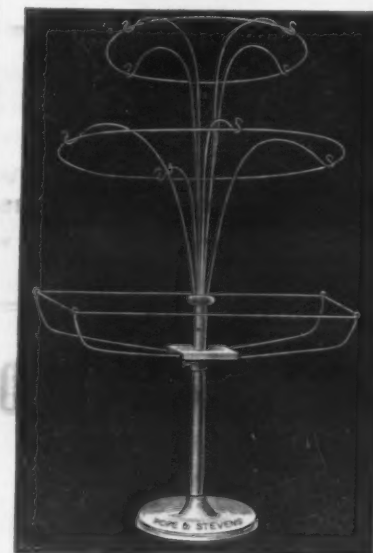
C. E. Jennings & Co., N. Y. Hibbard, Spencer, Bartlett & Co., Chicago.

Simmons Hardware Co., St. Louis, Mo Walbridge & Co., Buffalo, N. Y. A. Freeman, Chicago.

And all other Hardware Dealers throughout the United States and Canada. Manufactured by

DECATUR COFFIN CO., Decatur, Ill.

HEADQUARTERS FOR DOG COLLARS, &c., &c.



Our new Basket Stand for displaying Dog Collars.

POPE & STEVENS

114 CHAMBERS ST. NEW YORK



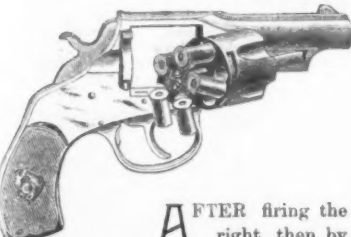
# JOHN P. LOVELL'S SONS, BOSTON, MASS.,

MANUFACTURERS OF  
Single Breech-Loading Shot Guns, Revolvers, Police Goods, Roller Skates.



**THE BEST YET!**  
**"SIDE SNAP CHAMPION"**  
Hammerless Single Breech-Loading Shot Gun.

**PRICES.**  
Plain Barrel, 12 bore.....\$15.00 | Twist Barrel, 12 bore.....\$18.00  
" " 10 " ..... 16.00 | " " 10 " ..... 19.00




**SAFETY DOUBLE ACTION REVOLVER.**  
Simple in Construction. Durable and Effective in Action.  
Retail Price, Nickel and Rubber Stock, \$7.50.

AFTER firing the revolver, by throwing open the gate the cylinder swings out to the right, then by pressing the cylinder down on base pin the exploded cartridges are instantly extracted, as shown in illustration. The revolver possesses all the advantages of any revolver in the market, with patent self-acting shell ejector, extracting all the empty shells by one motion, and the price is much lower than those of other makes. We make this at present to use only the 38 S. & W. C. F. Cartridge.

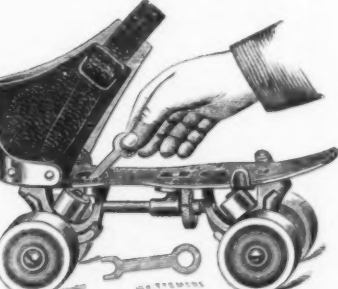


**NEW MODEL**  
Top Snap Champion Breech-Loading  
**SHOT GUN.**

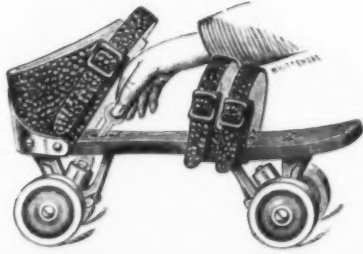


**LOVELL ROLLER,**  
ALL CLAMP.

**LOVELL ROLLER SKATES,**  
LATEST AND BEST.

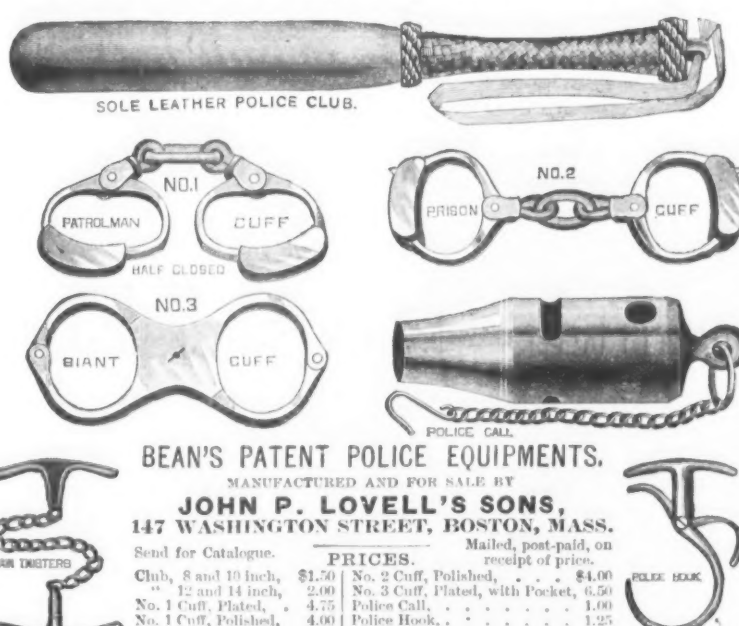


**LOVELL ROLLER,**  
HALF CLAMP.



**LOVELL ROLLER,**  
RINK.

Special Inducements to the Trade to Handle Our Goods.  
Send for our New Illustrated Catalogue.



**SOLE LEATHER POLICE CLUB.**

**BEAN'S PATENT POLICE EQUIPMENTS.**  
MANUFACTURED AND FOR SALE BY  
**JOHN P. LOVELL'S SONS,**  
147 WASHINGTON STREET, BOSTON, MASS.

Send for Catalogue.

PRICES.	
Clubs, 8 and 10 inch,	\$1.50
" 12 and 14 inch,	2.00
No. 1 Cuff, Plated,	4.75
No. 1 Cuff, Polished,	4.00
No. 2 Cuff, Plated,	4.75
No. 2 Cuff, Polished,	4.00
No. 3 Cuff, Plated, with Pocket,	6.50
Police Call,	1.00
Police Hook,	1.25
Twisters,	1.00

Mailed, post-paid, on receipt of price.



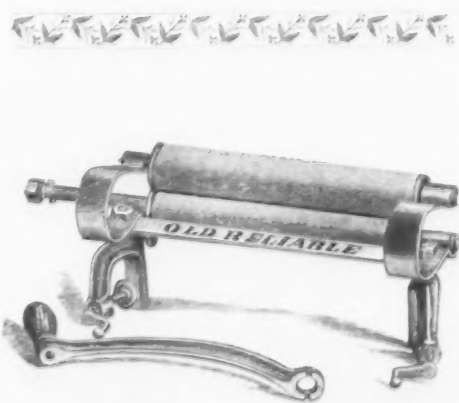
**AMERICAN "BULL DOG"**  
**DOUBLE ACTION REVOLVER.**

**PRICES.**  
AMERICAN BULL DOG, 20 Calibre, \$3.50  
" " " 22 " 4.00  
" " " 25 " 4.50  
" " " 28 " 5.00  
All these Revolvers are made with Hard Rubber Stocks.

## LOVELL MFG. CO., LIMITED, ERIE, PA.

### — MANUFACTURERS OF — CLOTHES WRINGERS,

DELUSION AND BONANZA  
**MOUSE TRAPS,**  
THE FOLDING WIRE  
**RAT TRAP,**  
Erie Rat Trap, &c.  
TO THE TRADE.



**GENTLEMEN:**  
We ask your special attention to our new line of Clothes Wringers. An experience of over thirteen years in the manufacture and sale of this class of goods, we believe, enables us to judge correctly of the wants of the trade and the public.  
Special care has been taken in the construction of all our Wringers to overcome difficulties and weak points that have been developed in this class of goods by past experience, and we believe a careful examination will show that we have succeeded in this respect in a marked degree.  
Our facilities for the production of these goods are unexcelled; we have a new factory, the latest and most improved machinery the best of skilled workmen, and are fully able to meet any demand that may be made upon us, either for quantity or quality.  
We do not use the old Tube Rolls in any of our Wringers, but use exclusively the Patent Rolls in which the Rubber is Vulcanized upon the Shaft.  
In all our lines of goods we shall endeavor to keep the standard of quality up to such a point of excellence as will merit the confidence and favorable consideration of the entire trade. All correspondence and orders will receive prompt and careful attention.

SEND FOR CATALOGUE.

Send for Our Catalogue.

Send for Our Catalogue.

## LOVELL MFG. CO., LIMITED, ERIE, PA.



# JAMES P WITHEROW, Engineer & Contractor

LEWIS BLOCK,

PITTSBURGH, PENNSYLVANIA,

GENERAL AGENT FOR

## WHITWELL FIRE-BRICK STOVES

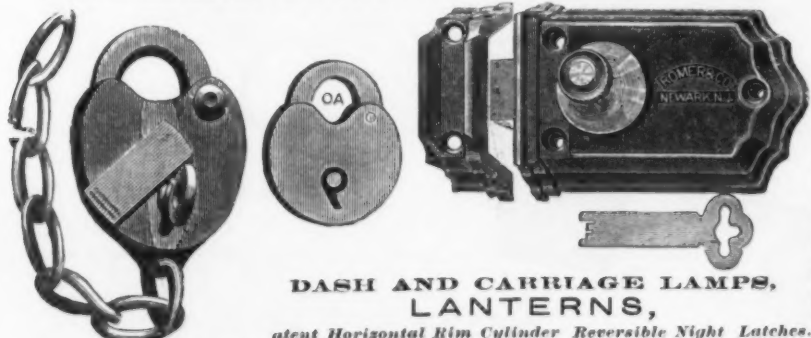
AND

Clapp-Griffiths Patents for Manufacture of Soft Steel,

SPECIALLY ADAPTED FOR A No. 1 BOILER PLATES, BOILER RIVETS, WIRE RODS  
STAY BOLTS STAMPING WARE, NAIL PLATES, &c.

Will contract to completely erect, equip and place in operation Blast Furnace  
Whitwell Stoves and Steel Plants as above. As I manufacture at our own works  
everything appertaining to Blast Furnace and Steel Works construction, can  
guarantee promptness and satisfaction.

**ROMER & COMPANY, Manufacturers of PATENT**  
**JAIL LOCKS, BRASS and IRON PADLOCKS,**

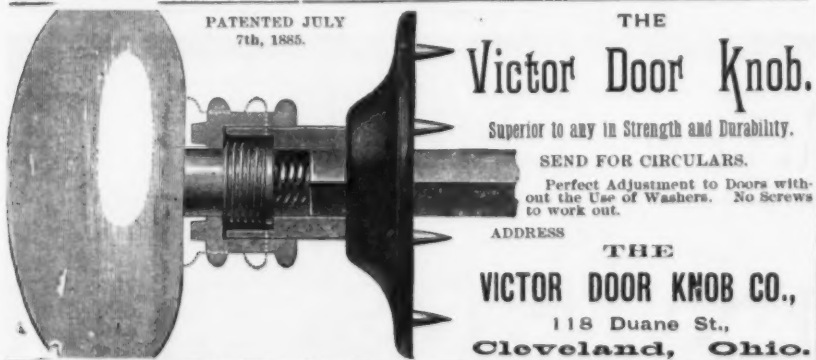


**DASH AND CARRIAGE LAMPS,  
LANTERNS,**

Patent Horizontal Rim Cylinder Reversible Night Latches.

Illustrated Lists sent to the Trade on application.

8-42 Summer Ave., near D. L. & W. R. R. Depot, Newark, N. J.



PATENTED JULY  
7th, 1885.

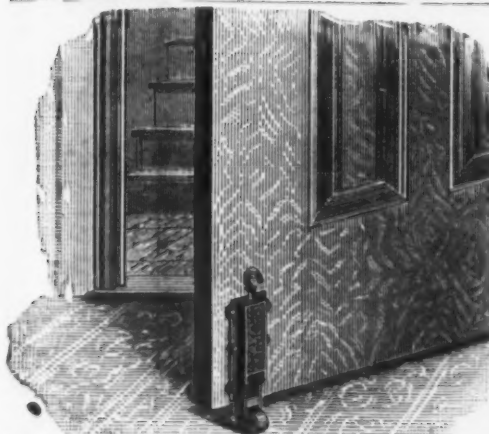
### THE Victor Door Knob.

Superior to any in Strength and Durability.

SEND FOR CIRCULARS.

Perfect Adjustment to Doors with-  
out the Use of Washers. No Screws  
to work out.

ADDRESS  
**THE  
VICTOR DOOR KNOB CO.,**  
118 Duane St.,  
Cleveland, Ohio.



### DOOR HOLDER

Coultaus' Patent.

PATENTED NOVEMBER 6, 1883.

Medal of Merit Awarded by the American  
Institute, New York, 1884.

The door is held in any desired position  
by the pressure of the roller on the floor,  
making it a most useful article for dwell-  
ing houses, offices, stores, hotels, railroad  
cars, hospitals, &c., and doing away with  
the hooks, chains, wedges, bricks, &c.,  
ordinarily used for this purpose. The  
rubber covering to the roller does not  
injure to carpets or oil cloths, and by  
simply lifting the handle the spring can  
be thrown out of use when desired. If  
the holders are required to operate  
against very strong springs or winds, it  
should be so stated when ordering.

**Sise, Gibson & Co.,**

AGENTS,

100 Chambers St., New York.

**MALIN & CO., 45 Viaduct St., Cleveland, Ohio,**  
Dealers in Steel, Copper, Brass, Tin Plated and Copper Plated Wire.

Manufacturers of BESSEMER STEEL WASHERS.

**PATENT SPOOL WIRE FOR THE RETAIL HARDWARE TRADE.**

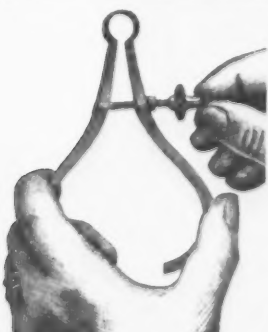
Dealers who handle it do away with the Broken  
BUNDLE BUSINESS and sell small quantities by the  
spool on y. It is a convenience for both dealer  
and consumer. It is SHELLAC COATED and CANNOT  
BUST: is wound like spool cotton on QUARTER  
POUND HALF POUND and ONE POUND Spools, one  
dozen spools in a box.

Our spooled Hair Wire is the best in the mar-  
ket.

For Sale by  
**Hardware Jobbers Everywhere.**

SEND FOR ILLUSTRATED PRICE LIST.

SPECIAL WIRES FOR MANUFACTURING PURPOSES ON ANY SIZE OF SPOOL.



### IRON LEVELS.

Sliding Nut Calipers.

Screw with Sliding Nut easily attached to  
old Calipers or Dividers.

**C. F. RICHARDSON, Athol, Mass.**

## E. L. Post & Co.

No. 10 Peck Slip,  
NEW YORK.

GENERAL AGENTS

TAYLOR'S

## Arctic Metal,

—FOR—

Journal Bearings, and Bab-  
bitting Purposes on Iron,  
Wood or Brass.

## Are You Troubled with Hot Boxes?

If so, a trial of this Metal will  
convince you of its merit, as we  
have yet to find an instance  
where, by its use, a Hot Bearing  
will not only run cool, but wear  
longer than with any other Metal  
manufactured.

The superiority of this metal  
over all others is as follows:

1. That while hot it is the  
least expanded.
2. When cold the least con-  
tracted.
3. When melted it flows thinner  
than any other metal.
4. It makes the most perfect  
Bearing, either on Cold Iron or  
Wood.
5. It resists heat as an element  
of waste longer than any other  
Anti-friction.
6. It is the best retainer of oil.
7. It requires a high degree of  
heat by friction to displace it.
8. When its base is cast iron or  
brass its density is sufficient to  
stand any weight or velocity.
9. Its cost is less than the best  
Babbitt.
10. The finest grained metal in  
the market.

In addition to all the qualities  
named may be added the most  
tenacious white metal in the mar-  
ket, and which in remelting will  
run almost as thin as water, with-  
out waste.

When once tried this metal is  
sure to take the place of all other  
anti-frictions.

*The nature of this metal  
is such that any dust, sand  
or grit which may find  
its way to the shaft through  
oil holes or otherwise does  
not grind between lining and  
shaft, but is immediately im-  
bedded in the metal, thus pre-  
serving shaft in perfect con-  
dition.*

The metal is cast in bars weigh-  
ing about 5 lbs. Each package  
contains printed directions for  
use.

N. B.

## THE ARCTIC ROLLING MILL METAL.

This metal, which is of the same  
general nature as our popular "ARCTIC  
METAL," is made to perform service  
where metal lining is subjected to  
intense pounding pressure.

We advise its use on Crank Pins,  
Cross Heads, Main Engine  
Bearings, Bearings of Heavy  
Rolling Mill Machinery, &c.

We guarantee it to do satisfactory  
service, no matter what the pressure.

*A Sample Order will meet  
with prompt attention.*

## THE SMITH & ECCE MFG. CO., BRIDGEPORT, CONN.

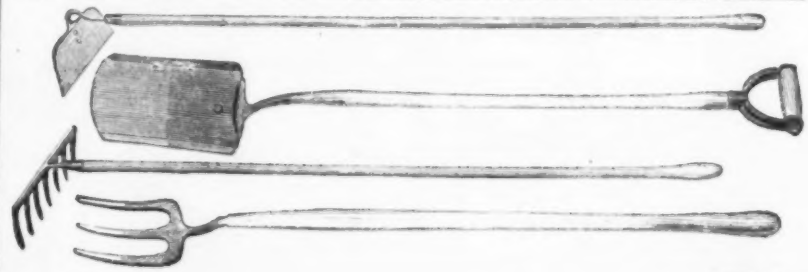


**THE GIANT PAD LOCK.**

Centennial Award. "Superior in Every Respect."  
This is one of the best selling locks in the market,  
and affords the dealer a large profit. It is thor-  
oughly and strongly made—of the best material—  
very hands in appearance, and every Lock is  
warranted. Orders solicited.

### THE GIANT METAL SASH CHAIN

is a substitute for cord in hanging weights to windows. It is manufactured by us only, and by auto-  
matic machinery, patented and owned exclusively by ourselves, and whereby we secure uniformity of  
construction and quality. We have been to great expense in producing a metal having all the qualities  
and conditions requisite for making suitable chain for this purpose, and to prevent other chain of the  
same pattern of link and of the same general appearance, but made from an inferior metal, being offered  
as the same thing, we patented the word "Giant" as a Trade-Mark, as applied to either metal or chain.  
Trade-Mark Registered April 16, 1878, and October 22, 1878, and our metal is therefore known in the  
market as "Giant Metal," and our chain as "Giant Metal Sash Chain."



## Garden & Floral Implements

MANUFACTURED BY

**C. W. DUNLAP & CO.,**

BROOKLYN, N. Y.

We make a larger variety of  
these goods than any other manu-  
facturer in the United States.

All Goods Made to a Standard.

Illustrated Catalogue furnished  
purchasers.

## PENNSYLVANIA WIRE WORKS,

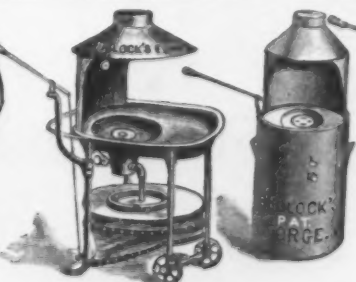
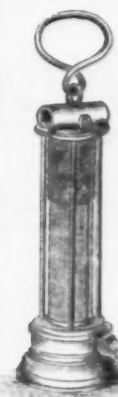
231 Arch Street, PHILADELPHIA.

**E. DARBY & SONS,**

MANUFACTURERS OF

**Brass, Copper & Iron Wire Cloth,  
Sieves & Riddles.**

Wire Window Guards, Wrought-Iron Railings, Brass  
and Iron Grille Work, Bank and Office Railings,  
Coal and Sand Screens, Iron Bedsteads, Miners'  
Safety Lamps, Universal, Davy and Clanny  
Make, Wire Gauzes for Lamps.  
Send for Catalogue.



**THE T. H. BULLOCK BELLOWS & FORGE CO.,**  
Cleveland, Ohio, U. S. A.



FUSE, CAPS, REELS,

BATTERIES,

AUGERS,

WIRES,

CAP NIPPERS,

ELECTRIC FUSES.

Thawing Kettles and Stump Blasting Tools.

There is no longer any doubt but Hercules Powder is the cheapest for all  
mining, quarrying, and railroad work, while thousands have proved it so for  
stumps and boulders.

**HERCULES POWDER CO., 40 Prospect St., Cleveland, O.**



GEO. B. TURRELL, Pres., 75 Chambers St., New York.

DUNCAN E. MAJOR, Treas. Torrington.

# UNION HARDWARE COMPANY,

TORRINGTON, CONN., U. S. A.

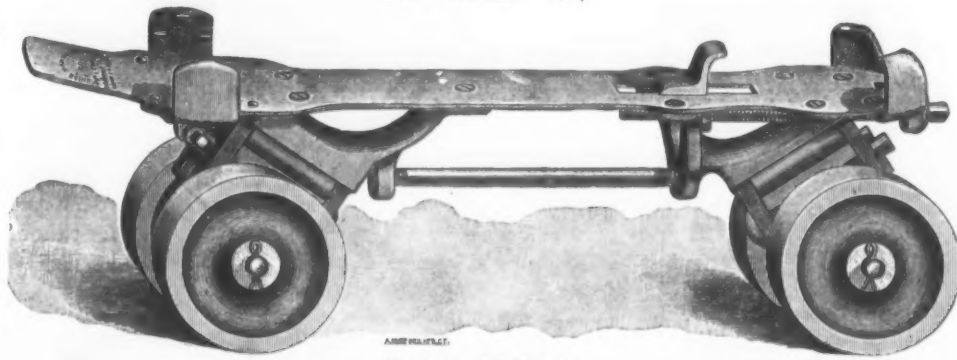
ESTABLISHED 1864.

This Cut Illustrates Our Latest Style

## CLUB SKATES

For Rink and Private Use,

BOTH FOR LADIES AND GENTLEMEN.



MANUFACTURERS OF

The advantage being that they will fit any style of heel, whether large or small, without the use of straps.

82. FROSTED NIQUELED.

Per Pair, \$5.50.

83. POLISHED NIQUELED.

Per Pair, \$6.50.

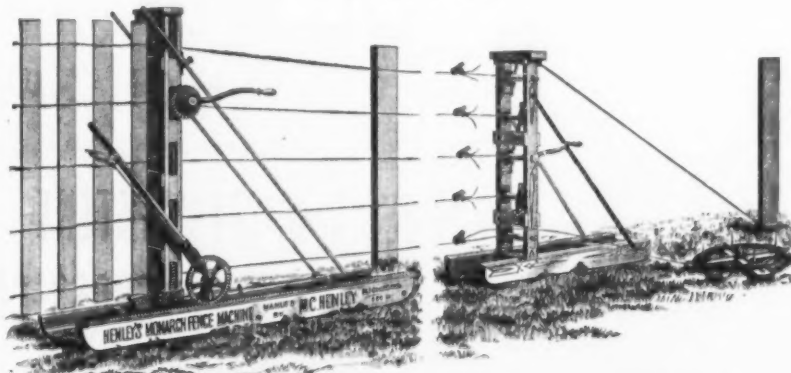
Ice and Roller Skates, and Specialties in Hardware, Wood Turners, and Electro-platers in Gold, Silver, Nickel and Brass.

ESTIMATES FURNISHED FOR WOOD TURNING AND PLATING ON APPLICATION.

# THE HENLEY MONARCH FENCE MACHINE.

PATENTED.

The only practical machine in use which makes the Fence in the field whenever wanted. It has no equal, and makes the best, strongest and most durable Fence for general use, and especially for farm and stock purposes. Weaves any length of picket, slat or board, and any size wire can be used. The Fence made by this machine is far superior



to any network wire or barb-wire Fence, and will turn all kinds of stock, sheep, hogs and poultry without injury to same. The Monarch machine is made of the best materials, is strong, light, durable, can easily be operated by man or boy, will last a lifetime, and the price brings it within the reach of every farmer to own a machine.

FOR FULL PARTICULARS, ADDRESS

**M. C. HENLEY, Sole Manufacturer,**

Mention this Paper.

Factory, 523 to 533 North 16th Street, RICHMOND, IND.

PIG IRON,

BAR IRON,

BAR STEEL,

STEEL BLOOMS,

STEEL BILLETS.

**RIVERSIDE IRON WORKS,**

MANUFACTURER OF

**RIVERSIDE STEEL NAILS,**

WHEELING, WEST VIRGINIA.

SMALL T RAILS,

FLAT RAILS

OF IRON OR STEEL.

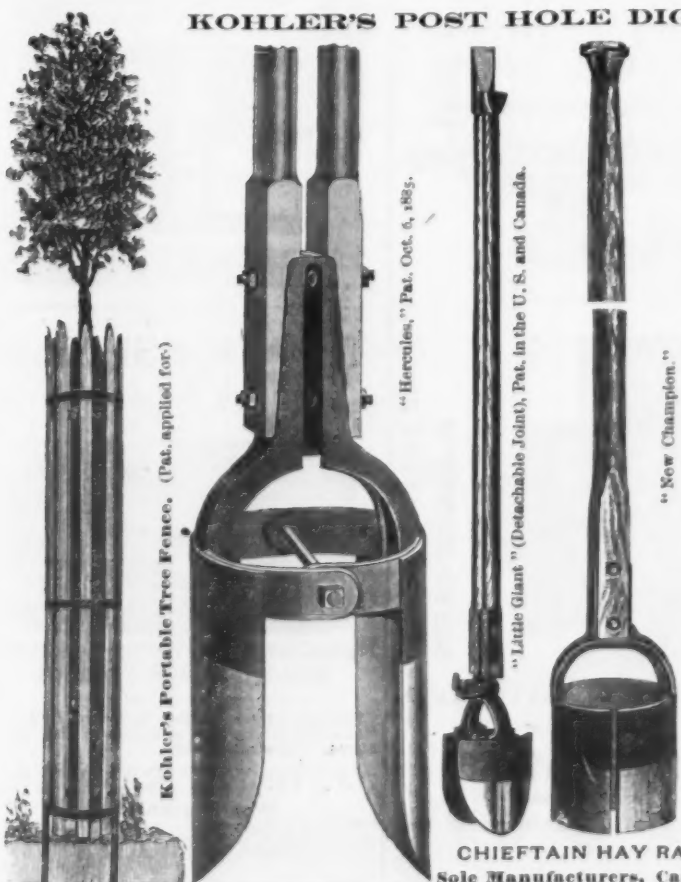
FISH BARS

OF IRON OR STEEL.

# IVES' PAT. SASH LOCKS & DOOR BOLTS.

For Sale by all Dealer in HARDWARE  
MANUFACTURED BY  
Hobart B. Ives & Co., New Haven, Conn., U. S. A.

**KOHLER'S POST HOLE DIGGERS.**



SISE, GIBSON & CO.,  
100 Chambers St., New York Agents.

WM. PICKETT & SON,  
161 Lake Street, Chicago Agents.

CHIEFTAIN HAY RAKE CO.,  
Sole Manufacturers, Canton, Ohio.

## GLENN'S Patent Balanced Hydraulic and Steam Valves

For Controlling Machinery on Men of War, Shipboard, Docks, Elevators, Rolling Mills and Steel Mills, &c.

For additional information and prices address

J. S. GLENN, Manufacturer, 115 Fremont St., Chicago, Ill.

**PHIPPS & BURMAN'S**

Patented Reversible, Self Sharpening, and other Improved

## CLIPPERS

For Horsemen and Barbers.

Please observe that every FIRST QUALITY CLIPPER  
1. Is NICKEL PLATED.  
2. Has BLACK HANDLES.  
3. Has a LEATHER POCKET.  
4. Is packed in a BOX bearing our LABEL.  
5. Is accompanied by a CERTIFICATE of genuineness.  
6. Is NUMBERED to correspond with certificate.  
7. Is examined and TESTED. Beware of imitations and inferiorities. Write for new illustrated catalogue and reduced prices, to

**JESSE LEE & SON,**

SOLE AGENTS,  
37 S. Fourth Street,  
Philadelphia.



"REGULAR GAUGE" for FLOURING MILLS, GRAIN ELEVATORS, &c.  
"Extra Heavy" for handling Ores, Coal, Broken Stone, &c.  
Send for illustrated price list.

**W. J. CLARK & CO., Sole Manufs.**  
SALEM, OHIO.

## HAMMOND'S Window Springs

Lock and support upper and lower sashes—all sizes. Are very convenient, simple and durable. Sample free. The trade free.  
W. R. HAMMOND,  
Lewisberry, York Co., Pa.  
Circulars give full instructions.

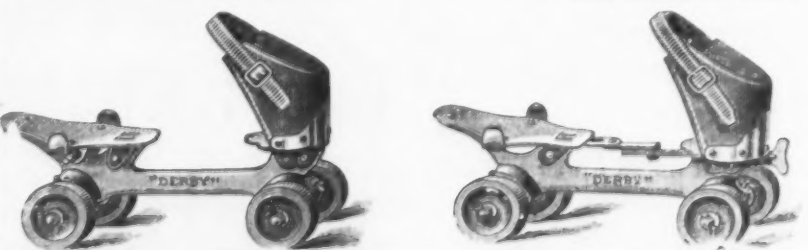


## "DERBY" ROLLER SKATES.

Manufactured by SISE, GIBSON & CO.

Warehouse: 100 Chambers Street, New York.

Factory: BIRMINGHAM, CONN.



McDANIEL'S SUCTION FITTING,  
Pat. Jan. 27, 1884.

Will stop all snapping and cracking noises in steam pipes; increases heat in dry rooms. The only fitting in the world that will do it. It is worked by steam after passing through the heaters.

McDANIEL'S PATENT EXHAUST-PIPE HEAD acts as a muffler, preventing noise of exhaust steam, and stops all spattering of water on roofs and pavements.



CHAPMAN'S Improved Steam Trap.

For Heating Apparatus, Dry Rooms, Breweries, Factories, Distilleries, Sugar Houses, Pipes leading to Steam Pumps in Mines, Canning Houses, &c.

All the above sent on trial and satisfaction guaranteed. Sold by the trade generally

**WATSON & McDANIEL, 248 N. 8th Street, PHILADELPHIA.**



JOHN T. LEWIS & BROS.  
No. 231 South Front St., Phila.



PURE WHITE LEAD,  
RED LEAD, LITHARGE, ORANGE MINERAL, LINSEED  
OIL and PAINTERS' COLORS.

JOHN JEWETT & SONS,  
MANUFACTURERS OF THE WHITE LEAD. WELL-KNOWN BRAND OF



ALSO MANUFACTURERS OF  
LINSEED OIL.  
181 Front Street, New York.



THE ATLANTIC WHITE LEAD  
and LINSEED OIL CO.

MANUFACTURERS OF  
WHITE LEAD (Atlantic), RED LEAD, LITHARGE, GLASS  
MAKERS' LITHARGE and ORANGE MINERAL  
Raw, Refined LINSEED OIL and Bottled

ROBERT COLGATE & CO.,  
287 Pearl St., New York.



Pat. Shellac-Coated Spool Wire  
Gauge from Nos. 16 to 36.

Steel Annealed and Tinned, Soft Brass, Spring Brass,  
Soft Copper, Black and Plated Hair Wire. Try an  
assortment and you will never handle wire for retail  
trade in any other way. Catalogues free.

GRAVES & MOORE, Hardware Specialists and Tools  
112 Chambers St., New York.

I. S. SPENCER'S SONS,  
GUILFORD, CONN.,  
Manufacturers of  
SCALES, BUILDERS' HARDWARE, LIGHT HARDWARE  
And all kinds of  
Light Grey Iron and Brass Castings of Superior  
Quality and Finish.  
CORRESPONDENCE SOLICITED.

Grindstones, Emery, &c.

GEO. H. WORTHINGTON, Pres. and Treas. WM. McDERMOTT, V. Pres. and Sec.

Berea & Huron Stone Company,  
Manufacturers of

GRINDSTONES,  
MOUNTED STONES,  
SCYTHE STONES, &c.

OFFICE:  
71 & 72 Wilshire Building. CLEVELAND, OHIO.

Walter R. Wood,  
GRINDSTONES,  
Berea, O., Nova Scotia & other brands.

283 and 285 Front St., New York.

GEO. CHASE.

Genline Green Paper Brand Wash  
Ita Stone is the Best

OIL STONE.

107th St., Harlem River, N. Y.

# EXCELSIOR AND NEW MODEL MOWERS.

EXCELSIOR SIDE WHEEL.



For Lightness of Draft, Quality of Work,  
Simplicity of Adjustments and Superior Work-  
manship our EXCESIOR LAWN MOWERS,  
both for Hand and Horse Power, occupy the  
first place in the markets of the world.

In order to meet the varied demands of both  
home and foreign markets we are making  
over 50 different styles and sizes of  
Lawn Mowers. Hence we can  
furnish a Lawn Mower suited  
to any climate or country.

ADDRESS

CHADBORN & COLDWELL MFG. CO., NEWBURGH, N. Y., U. S. A.,  
Or 223 Upper Thames St., London, England.

THE "NEW MODEL," our Latest and  
Best Mower, combines every improve-  
ment that nearly a score of years' experience  
as Lawn Mower manufacturers can suggest  
or mechanical skill devise. For Simplicity,  
Durability and Quality of Work it is un-  
equalled, while for Lightness of Draft  
it excels by a large percentage any  
other Lawn Mower made. We fully  
guarantee every claim we make,  
and are ready at any time to  
practically demonstrate their  
truth. A most thorough trial  
is solicited.



EXCELSIOR ROLLER MOWER.



The lightest Roller Mower in the market is  
our EXCELSIOR. It is most easily operated.  
Cuts Borders best. Leaves the Lawn in the  
best condition, and does the most perfect  
work. Those wishing a Lawn Mower of  
this Pattern are advised to give our EX-  
CELSIOR a trial before purchasing.

Every Mower Guaranteed.

Send for Circular and Price List.

THE UNION SAW CO.,

MANUFACTURERS OF ALL KINDS OF

SAWS, SAW-SETS, PATENT  
CROSS-CUT HANDLES,

TOOLS AND FILES,

and Sole Proprietors and Manufacturers of

The Boynton Patent Lightning Saws.



THE UNION SAW COMPANY,  
34, 36, 38, 40 and 42 DEVOE STREET,  
BROOKLYN.

FACTORY: 34, 36, 38, 40 and 42 DEVOE ST. BROOKLYN.  
OFFICE AND WAREHOUSE: 337 BROADWAY.

HEINZ & MUNSCHAUER, Buffalo, N. Y.,

Nos. 2 to 22 Randall St. and 12 to 20 Superior St.,

MANUFACTURERS OF

BRASS AND JAPANNED BIRD CAGES.

Assorted Case Cages.

REFRIGERATORS,

Grained and Hardwood.

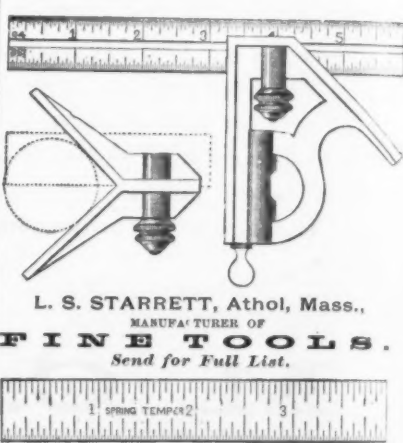
Water Coolers and Filters, Coal Hods and  
Vases, Children's Sleighs,

—AND JOBBERS IN—

White Mountain Freezers, Tea  
Trays, Kettles

—AND—  
HOUSE-FURNISHING GOODS.

Send for Illustrated Catalogue and Price List.



L. S. STARRETT, Athol, Mass.,  
MANUFACTURER OF  
FINE TOOLS.  
Send for Full List.



Gooch Peerless and Giant Freezers.



Peerless.

OUR  
FREEZERS  
STAND UNRIVALLED.  
The best Goods ever  
made.

SUPERIOR IN EVERY PARTICULAR.

NO OTHER  
FREEZERS  
EVER HAD SUCH A SALE.

MANUFACTURED BY THE

GOOCH FREEZER COMPANY,

Nos. 28, 30, 32, 34, 36 and 38 E. NINTH ST.,  
COR. SYCAMORE,

CINCINNATI, U. S. A.



Giant.

WOODENWARE.



Cooper & McKee,

Manufacturers of

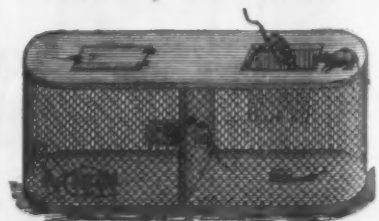
REFRIGERATORS

For all Purposes.

Office, 113 to 119 Gwinnett Street,  
BROOKLYN, N. Y.

MEAT SAFES,  
BLACKING CASES.

The "BOSS" Trap.  
The Only Rat Catcher.



Noiseless, Self-Setting, Always  
Ready, Easily Cleaned.

For sale by the leading Hardware, Stove and  
House-Furnishing Goods houses in the United  
States. Manufactured by

J. B. KENDALL,  
Washington, D. C.

Fuller Manufacturing Co., General Agents, 17 Mar-  
ray Street, N. Y. H. C. Elder, Agent for Philadelphia,  
1361 Market Street, Philadelphia, Pa.

THE WALKLEY HARDWARE CO., Plantsville, Conn.,  
MANUFACTURERS OF

TACKS, BRADS, &c.

We call the attention of the Trade to our "Diamond" and "Circle" brand Steel Carpet  
Tacks. "Diamond" brand, Uniform Weights: "Circle" brand, Double Uniform Weights: 6, 8,  
10, 12, 14, 16 ounce. "Diamond" brand, list, Blued, 37 1/2 c.; Tinned, 50 c. "Circle" brand, list, Blued,  
75 c.; Tinned, 92 c. Warranted equal to Swedes in all essentials.

BUFFALO SCALE CO.,  
BUFFALO, N. Y.,

Manufacturers of

R. R. Track Scales, Hay Scales, Coal  
Scales, Grain Scales, Platform  
Scales, Counter Scales, &c.

Send for price list, stating what you want.



LITTLE GIANT  
WAGON

Tire Upsetter,

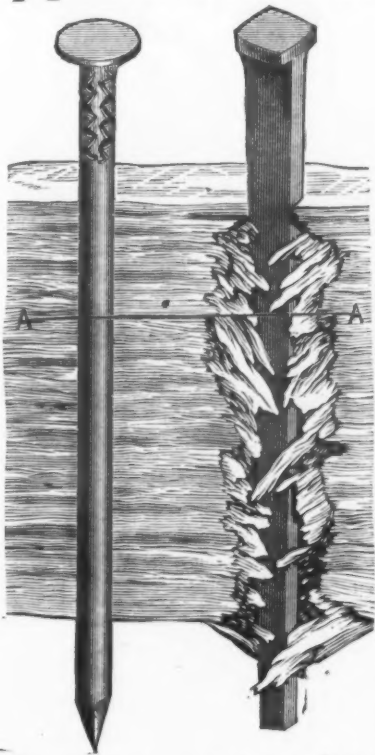
The Best and Cheapest.

Send for Circular,  
price lists and discount.

LITTLE GIANT MFG. CO.,  
MILLPORT, N. Y.



THE  
Salem Wire Nail Co.,  
SALEM, OHIO,  
MANUFACTURERS OF  
WIRE and . .  
WIRE NAILS.



The above cut represents the effect on wood of a Cut Nail and a round, pointed Steel Wire Nail.

The Steel Wire Nail is just as cheap as the Cut Nail, and far preferable to use.

Write for Price List and Discounts.

We Are Headquarters  
FOR  
Penny Wire Nails.  
MINERAL WOOL

(Protected by U. S. Patents.)

An Indestructible Material.

The BEST and CHEAPEST material known for

INSULATION OF HEAT,

PROTECTION AGAINST FROST,

PREVENTION OF SPREAD OF FIRE,

FREEDOM FROM RATS, MICE & INSECTS

DEADENING OF SOUND.

Used in buildings. It keeps the TEMPERATURE UNIFORM, SAVES largely in the EXPENSE of heating; renders the walls and floors exempt from the CONDUCTING OF SOUND. Completely NON-COMBUSTIBLE, it is very valuable for FIRE-PROOFING. AS A NON-CONDUCTING COVERING for Steam Pipes, Boilers, Drums, Hot Air and Blast Pipes, and all heated surfaces, and as a Protection against Frost for Waste Pipes.

Mineral Wool is Invaluable.

Over Ten Million Pounds in Use.

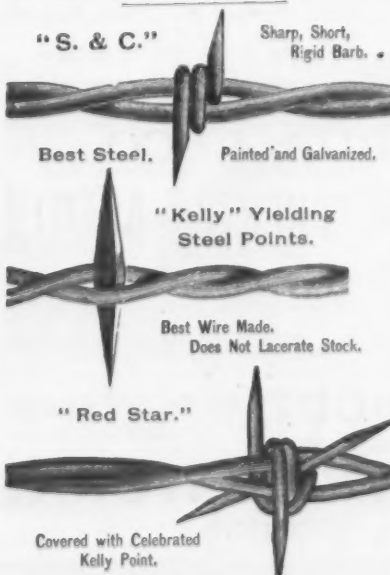
For Samples, Information and Prices, address

The Western Mineral Wool Co.,

P. O. Box 123.

CLEVELAND, OHIO.

THORN WIRE HEDGE CO.  
STEEL BARB WIRE FENCING.

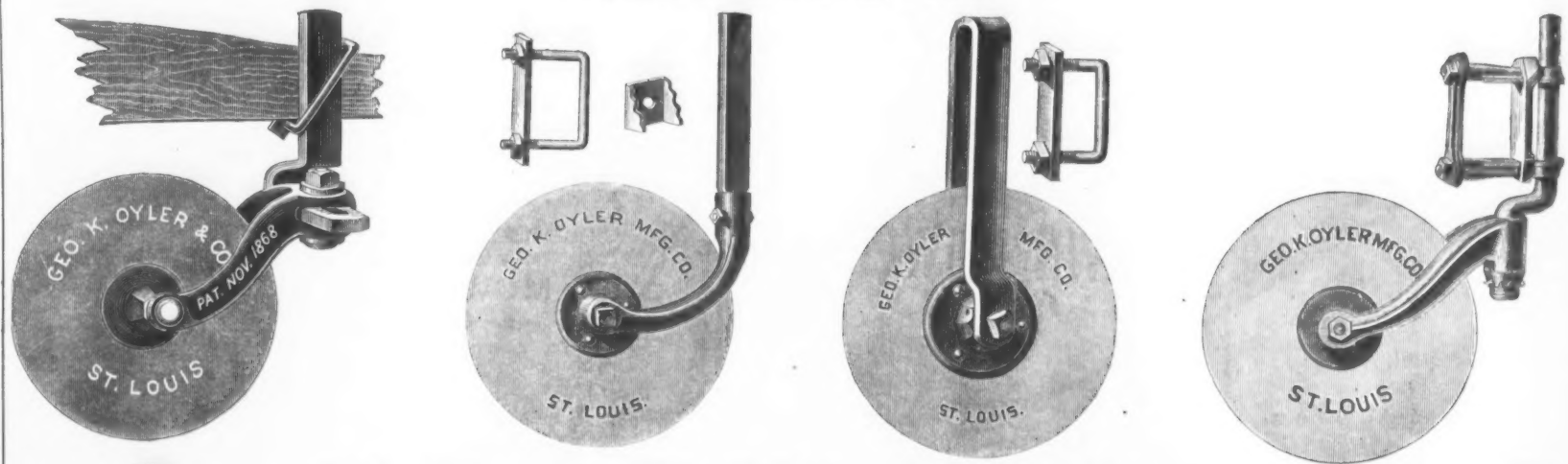


ADDRES, THORN WIRE HEDGE CO., CHICAGO.

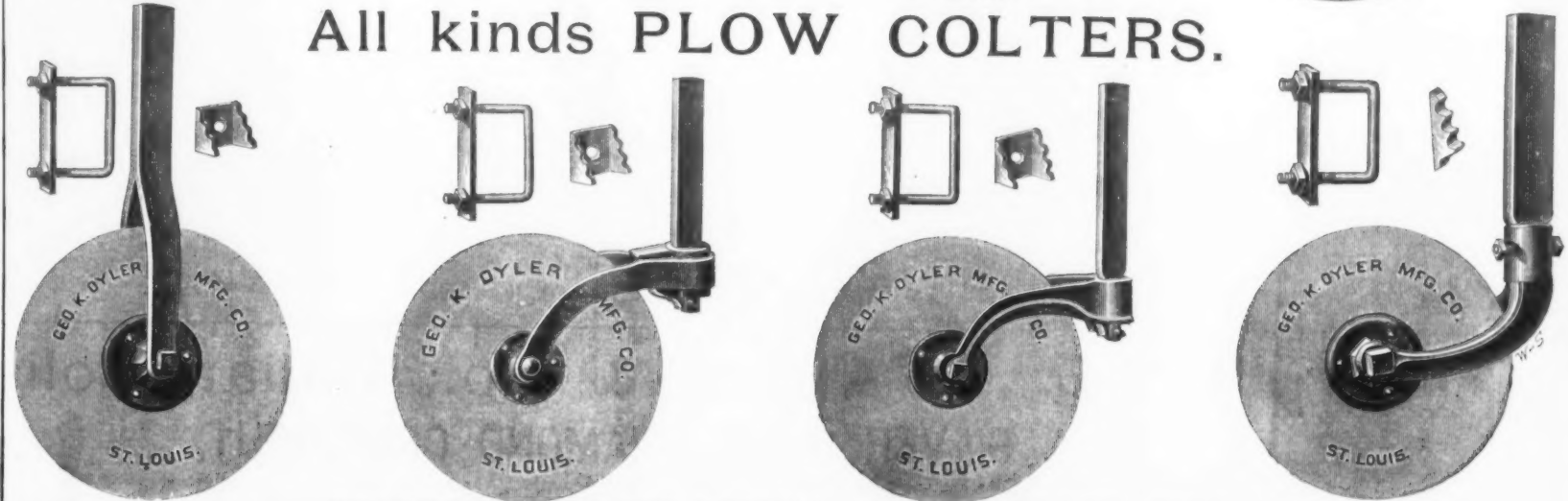
Samuel Martin,  
MANUFACTURER OF  
Theatrical Hardware,  
127 Eighth Avenue, New York.

GEO. K. OYLER MFG. CO.,

SAINT LOUIS, MO.



All kinds PLOW COLTERS.



DEALERS WRITE FOR SPECIAL CATALOGUE AND PRICES.

GOODELL COMPANY'S

NEW  
LINE

BEECH RIVETED HANDLE BUTCHER KNIVES

Are made from the Best Quality Steel, tempered with great care, and are Warranted Superior

CUTTERS.



No.	445	445 1/2	446	447	448	449	451	453	455	
PRICE LIST.	\$2.20.	\$2.30.	\$2.40.	\$2.64.	\$2.88.	\$4.00.	\$6.90.	\$8.50.	\$10.80.	inch blade per dozen.

DISCOUNT ON APPLICATION.

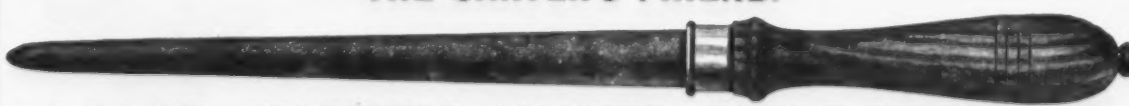
We make a full line of Solid Coco and Beech Handle Butcher Knives, in all sizes and styles, including the "Celebrated Goodell's Star Butcher," also Hunting, Sticking, Skinning, Butter, Cheese, Shoe, Cigar, Putty, Bread, Steak and other Knives in great variety.

Our Catalogue showing new patterns of Table Knives can be had on application.

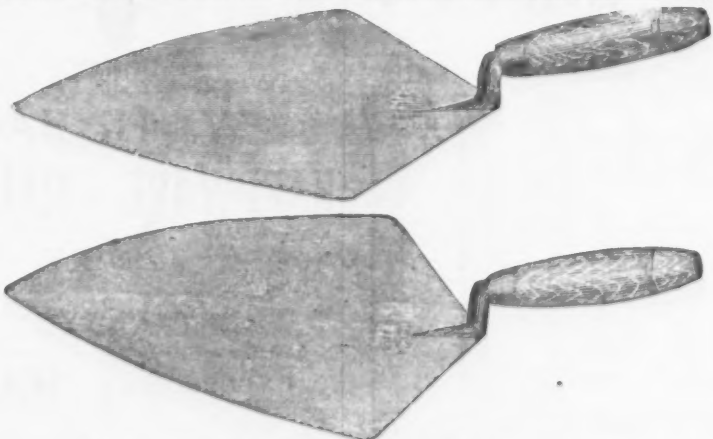
GOODELL COMPANY, Antrim, N. H.

THE ALFORD & BERKELE CO., Agents, 77 Chambers St., New York. (P. O. Box 2002.)

"THE CARVER'S FRIEND."



SOLID EMERY KNIFE SHARPENERS.



OUR PIERSON BRAND OF

BRICK AND POINTING TROWELS

are now well known to the trade, and we can confidently state from the severe practical tests given them that they are equal, if not superior, to the best English Trowel made. Each Trowel is carefully examined before it leaves our shop. For sale by

BRADLEY & PIERSON MFG. CO.,

298 BROADWAY, NEW YORK.

NIAGARA STAMPING AND TOOL CO.,

MANUFACTURERS OF

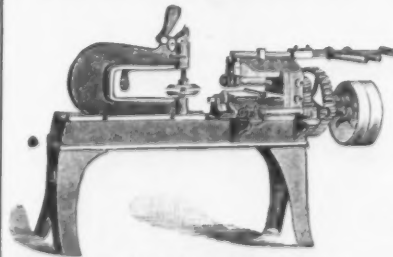
Machinery for Shearing Metal in all its Various Forms.

POWER SQUARING AND CIRCLE SHEARS,

POWER SLITTING SHEARS,

Power Chopping Shears,

For Tack and Nail Plates, and for Cutting Steel for Cutlery Works.



Power Circle and Slitting Shears No. 205.

Send for our complete Illustrated Catalogue and Price List, and mention this paper.

OFFICE AND WORKS  
Superior, corner Randall Streets,  
BUFFALO, N. Y.



BUTTERFIELD & CO.,

MANUFACTURERS,

Derby Line, Vt.

Send for Discounts.



## "PENNSYLVANIA."

We defy any one to produce its equal. The Pennsylvania Lawn Mower Works have now in their possession a 16-inch Pennsylvania Mower which was sold to an institute in this State, which was used nearly every working day constantly from the day it was purchased until they got it in their possession. This mower cut 500 acres of grass, was sharpened but once during use, and, although it has not been sharpened since it came from the ground, nevertheless will cut the finest paper.



Has No Equal,

Surpassing All Others

AND PRONOUNCED

"THE BEST."

Illustrated Price Lists sent upon application. Please write for same to  
LLOYD & SUPPLEE HARDWARE CO., Phila.  
J. C. McCARTY & CO., New York.  
AMES PLOW CO., Boston, Mass.  
SEYMOUR HARDWARE CO., St. Louis, Mo.  
HAMILTON & MATTHEWS, Rochester, N. Y.  
MARKLEY, ALLING & CO., Chicago, Ill.  
LOGAN, ORRIG & CO., Pittsburgh, Pa.  
JANNEY, SEIPLE & CO., Minneapolis, Minn.  
HUNTINGTON, HOPKINS & CO., San Francisco and Sacramento, Cal.  
POSTER, STEVENSON & CO., Grand Rapids, Mich.  
GEO. TRITCH HDW. CO., Denver, Col.  
MOOREHOUSE, WELLS & CO., Decatur, Ill.  
A. E. BONESTEELE, Troy, N. Y.  
WALBRIDGE & CO., Buffalo, N. Y.

## 1886 PENNSYLVANIA LAWN MOWER.

## "QUAKER CITY."

The trade will soon find an ordinary and roughly-made Reel of blades and stationary knife is not all that is required to make a perfect Lawn Mower.

## THE QUAKER CITY LAWN MOWER. 1886.

Guaranteed  
Superior to any  
other Center Cut  
MOWER  
on the market.

## THE QUAKER CITY Reduced in Price.

NOW, WHY BUY A WORTHLESS MOWER?

Send for List.

LLOYD & SUPPLEE HDW. CO., Philadelphia.  
J. C. McCARTY & CO., New York.

## "CONTINENTAL."

DOUBLE GEAR.

The Cylinder Knives are solid cast steel, made by a patented process; are hardened and tempered in oil; self-sharpening and never require a file or stone after leaving the factory. All the bearings are long, so that the wear on the Mower will be slow, and oil seldom required. It is made to run at high speed, and will not only cut higher grass, but leaves the lawn perfectly smooth.



## Continental Lawn Mower. 1886.

LIGHTEST RUNNING  
AND  
SWIFTEST CUTTING.

## CONTINENTAL LAWN MOWER CO., PHILADA.

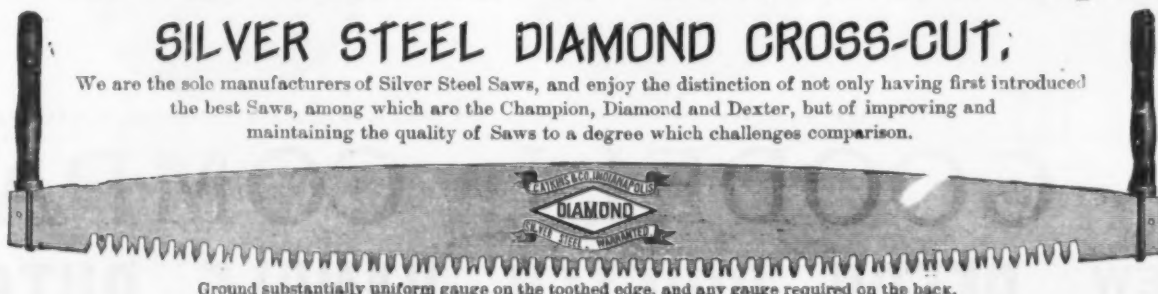
Illustrated Price Lists sent upon application. Please write for same to  
J. C. McCARTY & CO., New York.  
NEWLIN, KNIGHT & CO., Philadelphia.  
A. F. SEEBERGER & CO., Chicago.  
C. W. FAIRMAN, Kansas City, Mo.  
VORNEGUT, Indianapolis, Ind.  
SAUL & DAVIS, Syracuse, N. Y.  
J. P. PHILLIPS & CO., Milwaukee, Wis.  
WEED & CO., Buffalo, N. Y.  
WOLFE, LANE & CO., Pittsburgh, Pa.  
GEO. WORTHINGTON & CO., Cleveland, Ohio.  
MOLINE PLOW CO., Kansas City, Mo.  
BOETTCHER HARDWARE CO., Denver, Col.  
DUNHAM, CARRIGAN & CO., San Francisco, Cal.  
BIGELOW & DOWSE, Boston, Mass.  
STEELE & AVERY, Rochester, N. Y.  
GEO. KINGOLD, Utica, N. Y.  
ISAAC WALKER HDW. CO., Peoria, Ill.



## E. C. Atkins & Co., Indianapolis, Indiana.

### SILVER STEEL DIAMOND CROSS-CUT.

We are the sole manufacturers of Silver Steel Saws, and enjoy the distinction of not only having first introduced the best Saws, among which are the Champion, Diamond and Dexter, but of improving and maintaining the quality of Saws to a degree which challenges comparison.



Ground substantially uniform gauge on the toothed edge, and any gauge required on the back.

## ATKINS' SAWS

Are Everywhere Recognized as the  
Standard of Excellence.



## DYNAMITE FOR ALL KINDS OF BLASTING CAPS, FUSE

AND ALL  
BLASTING SUPPLIES.

Write for Illustrated Pamphlet. Mailed free. Agents wanted.

AETNA POWDER CO.,

98 Lake St., Chicago.

## GIANT STOVE TRUCK.

Handle 5 feet long.

FOR GENERAL USE.

It is light and strong, stands alone, occupying little space, and very cheap. Made in two sizes, and finished in oil. Steel Points. It will carry 500 lbs. Just the Truck for Barrels, Kegs, Cases, &c.

PRICE,  
No. 100, each, \$2.25  
No. 101, ea. h. 2.50

Trade discount 33 1/3 %.

MANUFACTURED BY

JOHN CAMPBELL,

Manchester, N. H.

Otis C. Brown, Western Agent, 154 Lake St., Chicago, Ill.

## CHAMPION IRON FENCE CO., KENTON, OHIO.

Largest Iron Fence and Railing Works in U. S.



SPECIALTIES—Iron Stairs and Jail Work, Builders' and Ornamental Iron Work, and the only manufacturers of Malleable Iron Casting, guaranteed against breakage; also manufacturers of the Celebrated Ohio Champion Iron Fence and Lift Pumps. Send for 10-page Catalogue.

CLINE'S PORTABLE

## FOOT HEATER AND FUEL,

Especially adapted for SLEIGHS, CARRIAGES, CABS, RUGGIES and Light Wagons. Also for OFFICE and RESIDENCE USE. SELLS AT SIGHT. For prices to the Trade, and circulars, address

CLINE MANUFACTURING CO.,

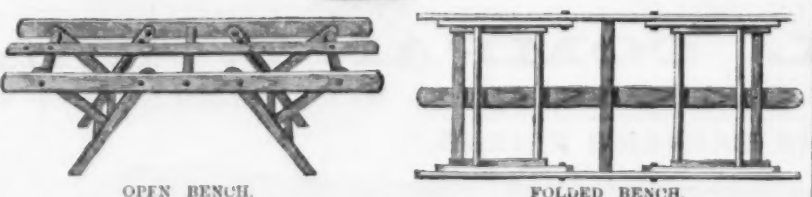
3304 State Street, CHICAGO.

No smoke, no smell, no noise, no danger.

## Our Purchase Gear

SAVES HALF THE LABOR OF OTHER WRINGERS

And Makes the Rolls Wear Much Longer.



Empire Wringer Co. AUBURN, N.Y.

Has No Equal for Lightness, Durability and Convenience.

SEND FOR ILLUSTRATED CATALOGUE D.

EMPIRE WRINGER COMPANY, AUBURN, N. Y.



## CHAMPION HORSE NAIL CO., Appleton, Wis

J. E. QUACKENBUSH & SON,  
MANUFACTURERS OF

Porcelain, Mineral & Jet Knobs & Escutcheons.

Send for Price List and Terms. OFFICE 535 5th Ave., N. Y.

## WIRE DOORS,

Two Dollars Each.

With Knob and Hinges ready to put up, in Green or Gray Colors. Fancy Designs 50 cents Extra. Liberal Discount to the Trade in wholesale lots.

Every house should have them to keep out Flies and Mosquitoes.

## THE BEST SPRING HINGES

Ever offered, perfect every way, 25 cents per pair.

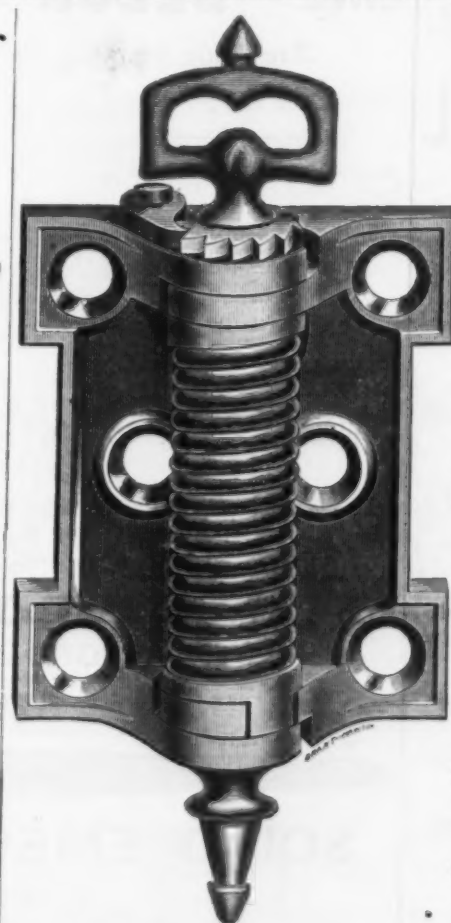
Painted Wire Cloth, Copper, Brass and Iron Wire Cloth, Brass and Copper Wire, Wire Ropes and Cords, Copper Cable Lightning Rods, Wire Work of all kinds.

## DE WITT Wire Cloth Co.,

87 Chambers St., New York.

703 Market St., Philadelphia.

110 Lake St., Chicago.



W. H. JACOBUS.

DONALD McKAY, Jr.

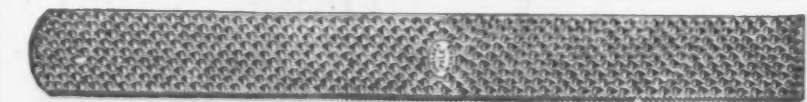
## W. H. JACOBUS & CO., HARDWARE MANUFACTURERS' AGENTS,

No. 90 Chambers Street, New York.

AGENTS FOR

The Morris Sash Lock Mfg. Co., The Ireland Mfg. Co., Lorenz Bommer, Penn Lock Works, Dibble Mfg. Co., Thurston Mfg. Co., Zimmerman's Blind Adjusters.

## EXCLUSIVELY HAND-CUT FILES and RASPS. MANUFACTURED BY THE CHELSEA FILE WORKS NORWICH, CONN.



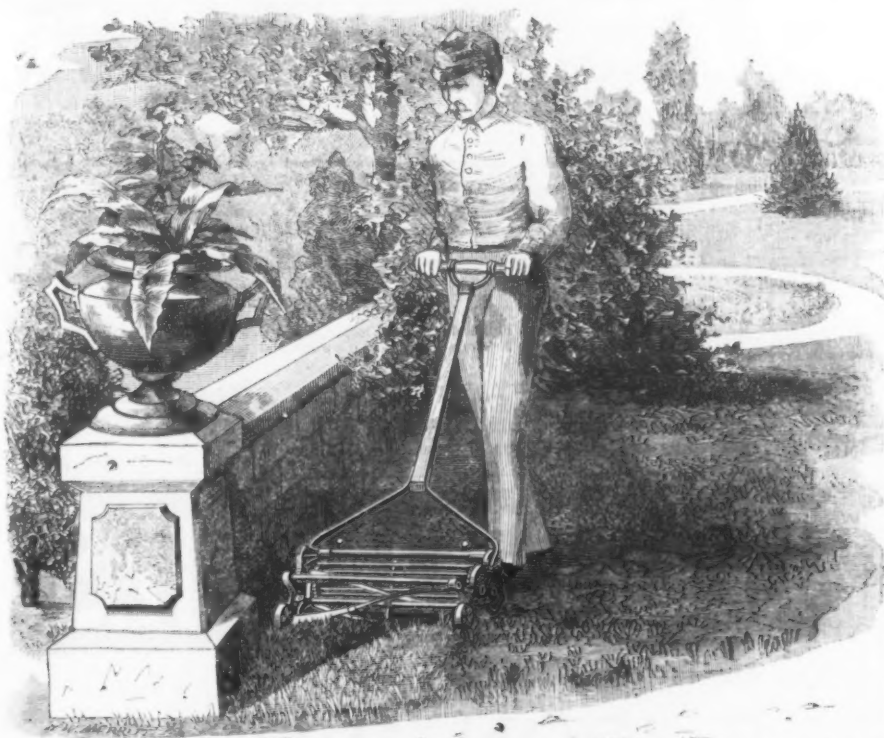
The superiority of our Horse Rasps over all others is universally admitted by those who use them, and their high degree of excellence will be scrupulously maintained. Give them a trial and use no others.



# THE "NEW EASY" LAWN MOWER,

MANUFACTURED BY

Blair Manufacturing Co., Springfield, Mass., U. S. A.



SPECIAL ADVANTAGE, No. 1.

The "NEW EASY" is the *only* Lawn Mower that will cut to within *one inch* of walls, fences, shrubbery, around trees, &c. (See above cut.)

To the Hardware  
AND  
Agricult'l Implement  
Trade.

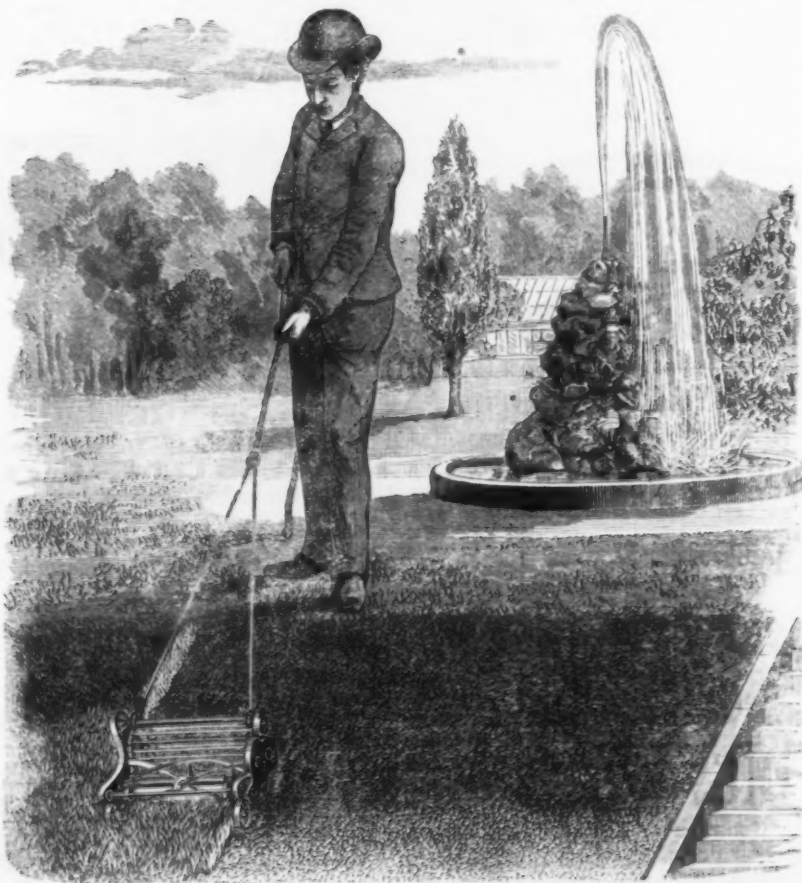
## Special Notice.

Do you want to handle the Lightest Running, Easiest Cutting, BEST SELLING Lawn Mower in the market? If you do, examine carefully the merits of the "NEW EASY," and you will know what Mower to buy. No Lawn Mower has yet been made that approaches so near to the ideal Machine for every kind and variety of work as the "NEW EASY." It stands pre-eminent and alone as the only perfect Mower manufactured, and combines the characteristic and exclusive advantages of the front-cut, traction-roller style of machine—viz., adaptability to every grade of lawn work, with extreme ease of operation.



SPECIAL ADVANTAGE, No. 2.

The "NEW EASY" is the *only* Lawn Mower that will run off its level and cut low terraces, mounds, flower beds, &c. (See above cut.)



SPECIAL ADVANTAGE, No. 3.

The "NEW EASY" is the *only* Lawn Mower with sufficient traction to cut high terraces with rope attachment. (See above cut.)

Herewith are illustrated a few of the special uses to which the "NEW EASY" is adapted, and that are not possessed or claimed for any other Mower, while for general purpose work it is *Chief of the best*.



Notice the "New Easy" Lawn Mower and What We Claim for It.

We do not advertise the "NEW EASY" as a Field Mower, nor assert that it will cut grass 12 inches high with perfect ease; but for a Lawn Mower, Strong, Durable, Easily Sharpened and Adjusted, of Varied Capacity, Graceful Form, Long and Pleasing Service, and so easily operated that a lady or child may use it without fatigue, we do claim the "NEW EASY" to be without a rival; and our Agents are authorized to sell this Mower with the express guarantee that these claims shall be verified by trial.



SPECIAL ADVANTAGE, No. 4.

The "NEW EASY" is the *only* Lawn Mower that will cut *narrow borders*. (See above cut.)

Every Mower unconditionally warranted. Made in Seven Sizes. 10 in. to 24 in. All for hand use.  
Catalogues and Price Lists of our Lawn Mowers, with discounts to the Trade, furnished on application to any of the following

## WHOLESALE AGENTS:

Louderback, Gilbert & Co., N. Y. City.  
Parker & Wood, Boston, Mass.  
L. M. Rumsey Mfg. Co., St. Louis, Mo.  
Charles M. Ghriskey, Philadelphia, Pa.  
E. S. Bristol & Gale, Chicago, Ill.  
Samuel G. B. Cook & Co., Baltimore, Md.  
Rice, Bohn & Co., New Orleans, La.  
Buhl, Sons & Co., Detroit, Mich.  
B. L. Bragg & Co., Springfield, Mass.  
George B. Bahr & Co., Louisville, Ky.  
Scobie & Parker, Pittsburgh, Pa.  
Baker & Hamilton, San Francisco, Cal.  
Baker & Hamilton, Sacramento, Cal.  
T. & A. Pickering, Cincinnati, Ohio.  
George Worthington & Co., Cleveland, Ohio.  
Bostwick, Braun & Co., Toledo, Ohio.  
John Patterson, Columbus, Ohio.  
George W. Rouse & Son, Peoria, Ill.  
Stewart & Montgomery, Rock Island, Ill.  
A. D. Perry & Co., Syracuse, N. Y.  
Corning & Co., Albany, N. Y.  
Howe & Co., Troy, N. Y.  
Shaughnessy Bros., Utica, N. Y.  
Cary, Wells & Co., Rochester, N. Y.  
Pardee & Co., Rochester, N. Y.  
Chaffee & Vertrees, Des Moines, Iowa.

E. D. Carter, Erie, Pa.  
Lindsay Brothers, Milwaukee, Wis.  
Hildebrand & Fugate, Indianapolis, Ind.  
Farwell, Ozman & Jackson, St. Paul, Minn.  
Northrup, Braslan & Co., Minneapolis, Minn.  
Reynolds & Gifford, Davenport, Iowa.  
Gardner & Co., Kansas City, Mo.  
A. J. Harwi, Atchison, Kan.  
R. G. Craig & Co., Memphis, Tenn. [Tenn.  
Howard, Ewing & Craig, Chattanooga, Tenn.  
W. W. Woodruff & Co., Knoxville, Tenn.  
R. F. Adams & Co., Nashville, Tenn.  
Horsley & Burek, Galveston, Texas.  
Noland & McRosky Hdw. Co., Dallas, Texas.  
W. F. Lake, Fort Worth, Texas.  
Lewis & Scott, Denver, Col.  
Low & Clasby, Salt Lake City, Utah.  
John Agnew, Columbia, S. C.  
Gilmour & Co., Montreal, for Canada.  
Mark & Co., New York, London and Hamburg, for Great Britain and the Continent of Europe.  
Henry W. Peabody & Co., Boston and New York, for Australia and New Zealand.  
F. B. Van Siclen & Co., New York, for Mexico.



## The "Bay State" Lawn Mower.

The Lightest and Quietest Running, Best Constructed, Handsomest and Most Durable Rear-Cut, Side-Wheel Mower Made!

Guaranteed first class in every respect, and superior to any other machine of this style in the market.

Four Sizes, 12 in., 14 in., 16 in., 18 in.



## THE "Boston" Lawn Mower

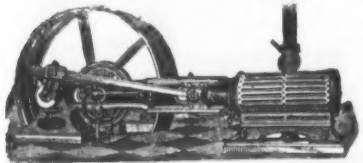
An adjustable, center-cut, side-wheel Mower of new and novel construction. Extremely easy and noiseless in operation. Unsurpassed for strength, durability and reliability. A light and perfect working Mower for the same money as would be paid for any of the so-called cheap machines, of which cheapness is the only merit. Dealers, take note of this: We offer the "BOSTON" at a reduced price to meet these worthless Mowers. You want the best for the money; buy a sample "BOSTON" and put it to the test. Nothing convinces like actual results. Send for prices and discount.

Three Sizes, 12 in., 14 in., 16 in.

We also Manufacture the "BAY STATE" and "BOSTON" Lawn Mowers, herewith illustrated and described.



## THE CUMMER ENGINE



Awarded Gold Medals and All Highest Premiums for BEST AUTOMATIC ENGINE at both Cincinnati and Louisville in 1883.

Send for 150-Page Illustrated Catalogue.

ADDRESS

THE CUMMER ENGINE CO., Cleveland, Ohio.



Issues Policies of Insurance after a careful Inspection of the Boilers,

COVERING ALL LOSS OR DAMAGE TO

BOILERS, BUILDINGS and MACHINERY,

ALSO COVERING LOSS OF LIFE AND ACCIDENT TO PERSONS, ARISING FROM

STEAM BOILER EXPLOSIONS.

Full information concerning the plan of the Company's operations can be obtained at the COMPANY'S OFFICE, HARTFORD, CONN., or at any agency.

J. M. ALLEN, Pres.

W. B. FRANKLIN, Vice-Pres.

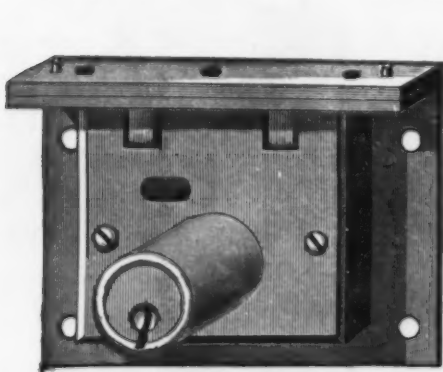
J. B. PIERCE, Sec.

BOARD OF DIRECTORS:

J. M. ALLEN, President.  
LUCIUS J. HENDEE, President Aetna Fire Ins. Co., Hartford and New York.  
FRANK W. CHENEY, of Cheney Bros., Silk Manufacturers, Hartford and New York.  
CHARLES M. BEACH, of Beach & Company.  
DANIEL PHILLIPS, of Adams' Express Company.  
GEO. M. BARTHOLOMEW, President Holyoke Water Power Company.  
RICHARD W. H. JARVIS, President Colt's Pat. Fire Arms Manufacturing Co.  
THOMAS O. ENDERS, of the Aetna Life Insurance Co.

LEVERETT BRAINARD, of the Case, Lockwood & Brainard Co.  
GEN. WM. B. FRANKLIN, Vice-President Colt's Pat. Fire Arms Mfg. Co.  
GEO. CROMPTON, Crompton Loom Works, Worcester, Mass.  
NEWTON CASE, of the Case, Lockwood & Brainard Co.  
NELSON HOLLIESTER, of the State Bank, Hartford.  
CHAS. T. PARRY, of Baldwin Locomotive Works, Philadelphia.  
HON. HENRY C. ROBINSON, Attorney at Law, Hartford.

## THE Charles Parker Co.,



Meriden, Conn.,  
Manufacturers of  
Cabinet Locks.

## "ECLIPSE" Pipe-Cutting Machines,

MANUFACTURED BY

PANCOAST & MAULE,  
243 & 245 South Third St.,  
PHILADELPHIA,

ARE  
EFFICIENT,  
POWERFUL,  
CHEAP

Send for Circular and Price-List.  
No. 1—Hand Pipe-Cutting Machine, cuts 1/4 to 1 inch.  
No. 2—Hand Pipe-Cutting Machine, cuts 1/4 to 1 inch.  
No. 3—Power Machine, cuts 1/4 to 1 inch.  
No. 4—Power Machine, cuts 1 to 4 in.  
Cutting-Off Machine, cuts 1/4 to 4 1/2 in.

ROLLING MILLS.	RIVET AND BOLT MACHINES.	PATENT POWER PRESSES.
WIRE MILLS.		
CHILLED ROLLS.		
SPINNING LATHES.		
TRIMMING LATHES.		
GRINDING MACHINES.	CARTRIDGE MACHINERY.	SCREW THREADING MACHINES.

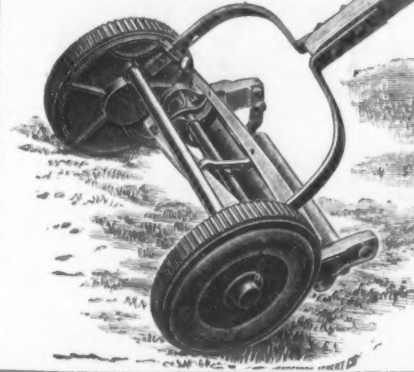
All Kinds of Special Machinery for Sheet Metal and Wire.

Wm. Rogers' German Silver and Plated Spoons and Forks. Send to SIMPSON, HALL, MILLER & CO., Wallingford, Conn., for Illustrated Catalogues. Branch Houses: 30 East 14th St., New York; 100 Commerce St., Phila.; 110 State St., Chicago, Ill.



Factories:  
Wallingford, Conn.

## ROWLETT'S



## CHAMPION LAWN MOWER.

The Most Durable, Practical and Lightest Running Machine in the Market,

AS WELL AS THE

LIGHTEST IN WEIGHT.

The Improved Backing Ratchet produces a continuous cut with the forward motion or an idle Reel when carrying the machine back.

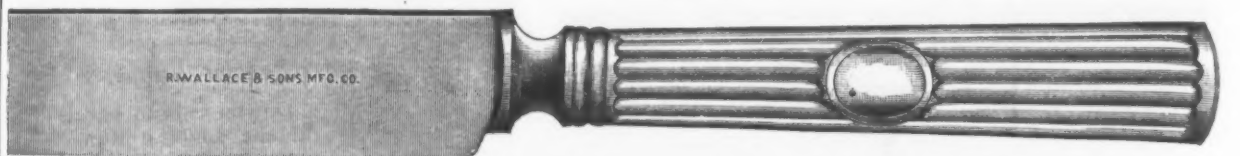
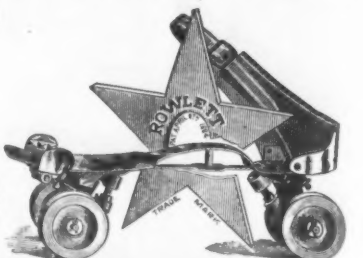
Sizes, 12, 14, 16, 18 and 20 Inches.

Send for Description and Prices and Discounts; also state the number of Machines you can handle.

ADDRESS THE MANUFACTURERS,

CHAMPION ROLLER SKATE AND WAGON CO.,

Office 1118 and Factory 1120 to 1124 North E St., RICHMOND, IND.



The above cut represents one design of our new Hollow Handle Knife, either silver or nickel silver handles, made of a seamless drawn tube. This handle is not soldered, as is the usual method, and yet has the taper and form necessary to produce the most durable and tasteful article of its kind ever shown. Knives can be furnished either plain or ornamented handles.

R. WALLACE & SONS MANUFACTURING COMPANY,

MANUFACTURERS OF SOLID SILVER WARE GUARANTEED 999 FINE, ALSO NICKEL SILVER HOTEL AND TABLE WARE,

Factories, WALLINGFORD, CONN.

New York House, 21 PARK PLACE.

## LA BELLE STEEL NAILS

OF EVERY VARIETY ARE MANUFACTURED BY THE

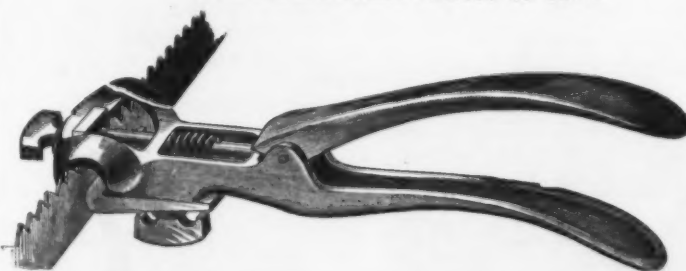
## LA BELLE IRON WORKS.

OFFICE AND WORKS,

WHEELING, W. VA.

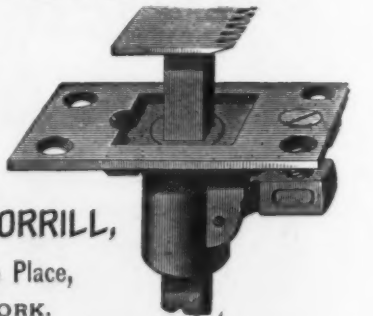
MORRILL'S PERFECT SAW SETS AND BENCH STOP.

FOR SETTING EVERY VARIETY OF SAWS

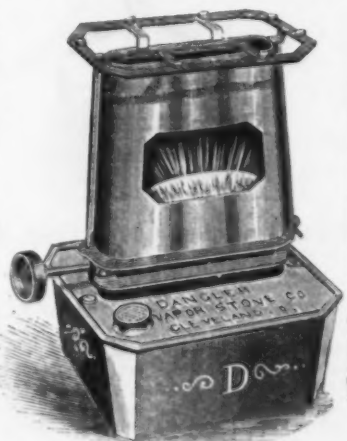


For price lists  
and discounts  
Address

CHAS. MORRILL,  
64 College Place,  
NEW YORK.



## EXCELSIOR Oil Lamp and Stove.



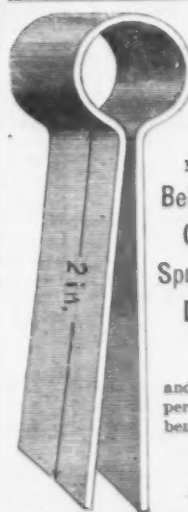
THE DANGLEX EXCELSIOR OIL LAMP AND STOVE.

This wonderful combination of heat and light is a marvel of convenience and economy, furnishing a powerful and pleasant light, and a heat sufficient to cook, broil and bake. Adapted for light housekeeping, Nursery, Camping, Milliner, Chemist, Photographer, Saloonist, &c., &c.

Weight of Lamp and Stove, 5 lbs. each.

We make the 2, 3 and 4 Burner light Oil Stoves for export. Special prices to the Trade on application. For further information, address

THE DANGLEX  
VAPOR STOVE AND REFINING CO.,  
Cleveland, Ohio, U. S. A.



BROWNING,  
SISUM & CO.,

85 Chambers St.,

Manufacture  
Belt Hooks,  
Cotters,  
Spring Keys,  
D Rings,  
Staples,

and everything  
pertaining to wire  
bending.

FACTORY,  
BROOKLYN.

## Chicago Double-Acting Spring Butts

MANUFACTURED BY THE

Chicago Spring & Butt Co.,

IN JAPANESE NICKEL OR BRONZE PLATED AND REAL BRONZE AND BRASS.

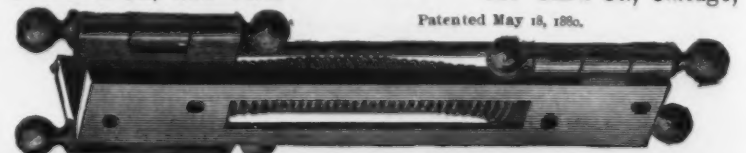
The BEST SELLING BUTT on the market. EASILY APPLIED, LOOKS WELL, OPERATES PERFECTLY.

Send for New Illustrated Catalogue and Prices.

97 Chambers St., New York.

OFFICES: 167 Clark St., Chicago, Ill.

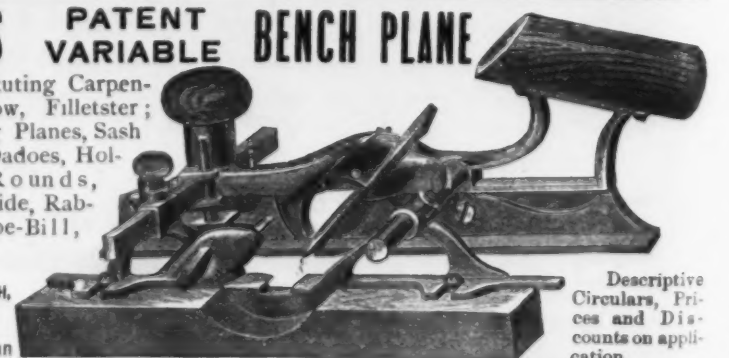
Patented May 18, 1880.



## FALE'S PATENT VARIABLE BENCH PLANE

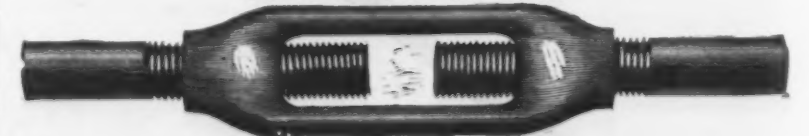
Constituting Carpenter's Plow, Filletster; Matching Planes, Sash Planes, Dadoes, Hollows, Rounds, Beads, Side, Rabbit, Snipe-Bill, Etc.

OTIS A. SMITH,  
Rockfall,  
Conn.



Descriptive  
Circulars, Prices  
and Discounts on application.

PRESSED WROUGHT IRON.



THE BEST AND CHEAPEST

Made by  
CLEVELAND CITY FORGE & IRON CO.,  
Cleveland, Ohio.

MERRILL BROS., 26 First St., Brooklyn, E. D., N. Y.

DROP FORGED



# LAMBERSON'S HARDWARE PRICE BOOKS.

## LARGE SIZE,

FOR OFFICE OR STORE USE.

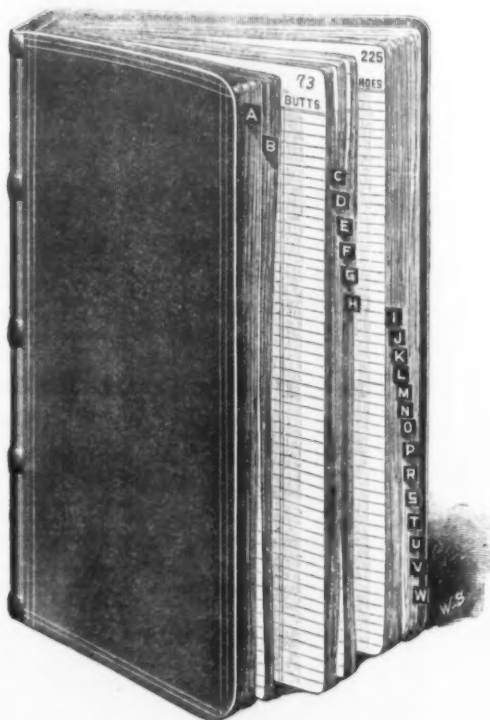
6 x 9 1-2 Inches. 500 Pages.

BOUND IN LEATHER.

**PRICE, \$8.00.**

Sent Postpaid on Receipt of Price.

COPYRIGHTED 1885.



## POCKET EDITION

4 x 7 INCHES. 250 PAGES.

With or Without Flap, as Ordered.

BOUND IN LEATHER.

**PRICE, \$4.00.**

Sent Postpaid on Receipt of Price.

THE illustration serves to show the general appearance of the Large Price Book. Dealers who have copies of the first edition will observe that the old classification is abandoned and the alphabetical arrangement adopted in its place. The names of different articles are printed at the upper corner of each page. The index cut on the front edge of the book, gives a ready reference to the beginning of each letter, and by turning the corners of the pages any item desired in that division can be very quickly found.

On the first page opened to, by the index letter, will be found a list of articles beginning with that particular letter, arranged with two spaces after each item, for additions of other goods in proper alphabetical order.

SIZES of leading lines are printed, and in case of Rules and Planes comparative numbers are given. Lists are omitted for the obvious reason that they are liable to change, but forms are arranged so that lists may be added with pencil. Useful tables are inserted on Strap Hinges, Nuts and Washers, Wire, Rivets, Stocks and Dies, Rope and Nails. The book is intended primarily for *Salesmen*, but it is no less useful to *Buyers* or *Stock and Entry Clerks*, and can be adapted to any purpose for which a price book may be desired. The general plan of the Pocket Edition is the same as in the large book, but the ruling and printing are on a smaller scale. The book is small enough to be carried in the pocket without inconvenience, but the arrangement is so perfect that it will cover a very complete line of hardware.

## UNIVERSAL DISCOUNT BOOK.

6 1-2 x 10 Inches. 32 Pages. Bound in Leather. Price, \$3.00.

THE BOOK consists of a collection of Standard Hardware Lists, printed in uniform style, good form and clear type, followed by a Discount Table showing extensions at 28 discounts, ranging from 10 to 80 per cent. Any other list required for frequent use may be added by the purchaser, and the discount table will apply equally well. If lists change, new ones may be substituted, and the use of the book is not in the least impaired. Other lists might have been added by the publisher, but would have interfered with the object, which was to make a book that would contain, in a compact and convenient form, the lists that are in hourly use in every hardware store.

The *Discount Table* is arranged so that reference is very quickly made. Computations are made on each figure from 10 cts. to \$5.00. From \$5.00 to \$15.00 the advance is by five cents, thus: \$5.05, \$5.10, &c., except in cases where printed lists contain odd figures which are inserted. From \$15.00 to \$50.00 only such amounts are extended as are required by the lists. If every amount from 10 cts. to \$50.00 was extended, the book would be increased in bulk about ten times, and would be so clumsy and expensive that it would be of no practical use. Enough figures are given to make the work serviceable as long as it lasts, and no change in lists can materially affect its usefulness. Many lists below \$5.00, and most lists above that figure, advance by five cents or its multiples. The main exceptions to this are Screws and some sizes of Bolts, and these are not important, as may be seen at a glance.

The Lists printed are as follows: CARRIAGE BOLTS, all the lists in use, five in number; TIRE BOLTS, MACHINE BOLTS, STOVE BOLTS, LAG SCREWS, AXLE CLIPS, FILES, IRON AND BRASS SCREWS, SCREW HOOKS AND EYES, GATE AND CORNICE HOOKS AND EYES; CAST BUTTS, plain, japanned and silvered acorn; NARROW WROUGHT BUTTS, STRAP AND T HINGES, TABLE HINGES AND FLAPS, BRASS BUTTS, AUGER BITS (Common), COOK'S, JENNINGS' AND IMITATION JENNINGS'. Other lists that might be used are suggested as follows: BLOCKS, COW BELLS, TACKS, BELT HOOKS, OILERS, CASTERs, SCALE BEAMS, CABINET LOCKS, RULES, PLANES, CHISELS AND GOUGES. Sent Postpaid on Receipt of Price.

## DAVID WILLIAMS, PUBLISHER AND BOOKSELLER,

66 AND 68 DUANE STREET, NEW YORK.



Miller, Metcalf & Parkin,  
PITTSBURGH, PA.,  
Manufacturers of

## CRESCENT STEEL,

IN BARS, SHEETS, COLD-ROLLED STRIPS, &c.  
Polished, Compressed Drill Rods and Wire.

Warranted equal to any imported in quality, finish and accuracy.

Also Common Grades.

S. & C. WARDLOW SHEFFIELD, ENGLAND,  
MANUFACTURERS OF THE CELEBRATED

## Cast and Double Shear Steel

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Razors, Table Knives, Mining Tools, Dies, Files, Clock, Watch and other Springs, and Sole Makers of the Special Brand "Tough" Cast Steel for Turning and other Tools.

OFFICES AND WAREHOUSE,  
95 JOHN STREET, NEW YORK.

FRANK S. PILDITCH, Agent.

## JESSOP'S STEEL

91 John St.,  
NEW YORK.

W. W. SCRANTON,  
President.

WALTER SCRANTON,  
Vice-President.

E. P. KINGSBURY,  
Sec'y and Treas.

THE SCRANTON STEEL COMPANY,  
MANUFACTURERS OF

## Steel Rails and Billets.

Works at SCRANTON, PA.

NEW YORK OFFICE  
47 BROADWAY.

HAVING STOOD THE TEST OF 130 YEARS COMPETITION, THEY ARE IN HIGHER REPUTE THAN EVER.

## JOHN WILSON'S CELEBRATED BUTCHERS' KNIVES & BUTCHERS' STEELS

ARE USED IN ALL THE PRINCIPAL SLAUGHTERING AND MEAT PACKING ESTABLISHMENTS OF THE UNITED STATES OF AMERICA, & THE AUSTRALIAN COLONIES; AND, WITH HIS EQUALLY CELEBRATED SHOE KNIVES HAVE FOUND THEIR WAY, AND CARRY HIS INTO ALL THE COMMERCIAL MARKETS OF THE WORLD.

BWARE OF CLOSE IMITATIONS OF THE KNIVES; ALSO OF COUNTERFEITS OF THE MARK, AS BOTH HAVE BEEN, AND ARE, FREQUENTLY ATTEMPTED.

WORKS: SYCAMORE STREET, SHEFFIELD, ENGLAND. Established 1750.

## THE STANDARD IRON COMPANY,

MANUFACTURERS OF

## SHEET IRON AND SHEET STEEL,

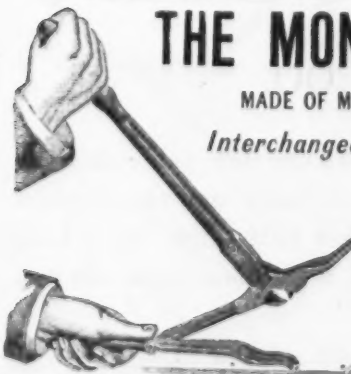
COMMON OR SMOOTH FINISH.

+ CORRUGATED +

## ROOFING, CEILING AND SIDING,

STRAIGHT OR CURVED.

Bridgeport, - - - - - Ohio.



## THE MONARCH NAIL PULLER.

MADE OF MALLEABLE IRON AND BEST TOOL STEEL

Interchangeable, Noiseless, Strong and Durable.

A Practical Tool for Pulling Wire Fence Staples. Cheapest and Best Nail Puller in the Market. It pays retailers to carry them in stock. Send for Samples, Price List and Discounts to

BRINTNALL & HENDRICK,

Patentees and Manufacturers,

ST. JOSEPH, MISSOURI.

BESSEMER AND OPEN-HEARTH

## BLOOMS, BILLETS AND SLABS.

H. E. COLLINS & CO., 34 Lewis Block, Pittsburgh, Pa.

## G. W. Bradley's Edge Tools.

Butchers' Cleavers, Butchers' Choppers, Axes and Hatchets, Crab Hoes and Mattocks, Mill Picks, Box Chisels and Scrapers, Ring Bush Hooks, Ax Eye Bush Hooks, Socket Bush Hooks, Watt's Ship Carpenters' Tools, Carpenters' Drawing Knives, Coopers' and Turpentine Tools.

FOR SALE BY

MARTIN DOSCHER, Agent, 95 Reade Street, New York.

## STEEL

Gautier Steel.

SEE PAGE 3.

LABELLE STEEL WORKS.

## SMITH BROS., & CO.,

MANUFACTURERS OF ALL KINDS OF

## STEEL.

ALSO SPRINGS, AXLES, RAKE TEETH, &c.

Office and Works, Ridge, Lighthill & Belmont Sts., and Ohio River, Allegheny.

POST OFFICE ADDRESS, PITTSBURGH, PA.

Represented at Boston by WETHERELL BROS., 31 Oliver St.; at Philadelphia by JAMES C. HAND & CO., 614 and 616 Market St.; at Cleveland by CONNIT, WICK & CO., 153 Water St.

## TROY STEEL AND IRON CO.,

TROY, N. Y., Manufacturers of

## BESSEMER STEEL RAILS,

Fish Plates, Bolts, Nuts, Spikes, &c. Machinery

Steel, Merchant and Ship Iron.

CHESTER GRISWOLD, Pres't, Duncan Building, 11 Pine St., N. Y. City.

## FRANCIS HOBSON & SON,

97 JOHN STREET, NEW YORK.

Sole Manufacturers of "CHOICE" EXTRA CAST STEEL.

MANUFACTURERS OF

## Warranted Best Cast Steel

FOR TOOLS AND DIES, AND

"CHOICE" EXTRA NEEDLE WIRE.

DON WORKS, SHEFFIELD, ENGLAND.

CHAS. HUGILL, Agent.

## R. MUSHET'S SPECIAL STEEL

FOR

## LATHES, PLANERS, &c.

Turns out at least DOUBLE WORK by increased speed and feed, and CUTS HARDER METALS than any other Steel. Neither hardening nor tempering required.

SOLE MAKERS,

SAMUEL OSBORN & CO., SHEFFIELD, ENGLAND.

Represented in the United States by

B. M. JONES & CO.,

No. 11 and 13 Oliver Street, BOSTON.

## NAYLOR & CO.,

99 John Street, New York.

Iron Ores, Bessemer Pig Iron,

Spiegeleisen, Ferromanganese,

Ferrosilicium, Scrap Iron,

Steel and Iron Wire Rods,

Norway Bars and Shapes,

Scrap Steel, Rail & Bloom Ends,

Old Iron and Steel Rails,

Tin Plates, Pig Tin,

Spelter, Lead, Sheet Zinc,

Iron and Steel Beams,

Steel Rails, Tires & Axles,

Steel Blooms, Slabs, Bars, and Hoops,

Cotton Ties.

## The Iron-Masters' LABORATORY.

Exclusively for the

Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestones, Clays,

Slags and Coal for Practical

Metallurgical Purposes.

No. 339 Walnut St., Philadelphia.

With Branch at Warrenton, Virginia,

J. BLODGET BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes, the object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

THE AMERICAN

## WIRE NAIL AND TACK MACHINE

(PATENTED)

Claims advantages over other machines for general simplicity, adjustment of cutters, both vertically and horizontally, greater gripping power through use of compound levers, positive adjustable knock-off, uniform feed and automatic barbing attachment.

A. R. WHITNEY & CO.,

SOLE AGENTS,

56, 58 and 60 Hudson Street, New York.

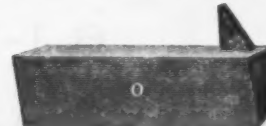
P. F. BURKE,

Successor to C. F. Dewick & Co.,

Manufacturer of

PATENT STEEL

## Toe Calks,



360 Dorchester Avenue, Boston, Mass.

## GLOBE IRON ROOF'G & PAINT CO.,

No. 20 Public Landing, Cincinnati, Ohio.

MANUFACTURERS OF THE

GLOBE STANDARD IRON ROOFING,

EXCELSIOR V-CRIMPED IRON ROOFING,

CORRUGATED IRON SIDING & CEILING

Suitable for all kinds of buildings.

Send to us for descriptive circulars and prices before placing your orders.

A. PARDEE, Hazleton, Pa.

J. G. FELL, Phila.

## A. PARDEE & CO.,

237 South Third Street,

PHILADELPHIA.

No. 111 Broadway, New York.

MINERS AND SHIPPERS OF

## LEHIGH COALS

The following superior and well-known Lehigh Coals are mined by ourselves and firms connected with us, viz.:

A. Pardee & Co.,

Pardee, Bro. & Co.,

Calvin Pardee & Co., HOLLYWOOD.

Pardee, Sons & Co., MT. PLEASANT,

HAZLETON,

CRANBURY,

SUGAR LOAF,

LATTIMER.

## NEWTON & SHIPMAN,

43 JOHN ST.,

GENERAL AGENTS FOR

NEW YORK.

## STEEL "F. W. MOSS" FILES.

AND

"MOSS & GAMBLE'S"

## THE MONTGOMERY IRON & STEEL COMPANY,

WORKS AT DANVILLE, PA.

## PIG IRON, T AND STREET RAILS,

Light Rails, 12 to 40 lbs. per yard.

RAIL JOINTS, SPIKES AND BAR IRON.

W. E. C. COXE, President, Reading, Pa.

F. P. HOWE, Gen'l Supt., Danville, Pa.



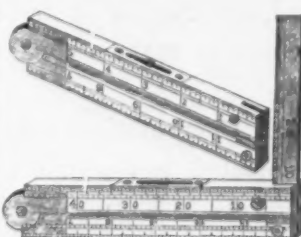
After EIGHT YEARS' test on the market, leads all competitors as the finest article, easiest to handle and gives best satisfaction. For sale by the leading Hardware Dealers all over the United States. Send for samples, circulars and discounts.

COURTENAY & TRULL, Proprietors, 15 Dey Street, NEW YORK.

KEEPS OUT COLD, WIND, SNOW, RAIN AND DUST.

Saves Fuel. Secures Comfort.

Only 10 Cents a Yard.



New York Store, 80 Chambers St.

STEPHEN'S COMBINATION RULE.

STEPHENS & CO.

RIVERTON, CONNECTICUT,

MANUFACTURERS OF

U. S. Standard Boxwood and Ivory Rules.

Also, Exclusive Manufacturers of

L. C. STEPHENS' PATENT COMBINATION RULE.

Send for Price List. Established in 1854.

## BRASS AND IRON SHIP CHANDLERY HARDWARE.

Yacht Fixtures, Nickel-Plated Canoe Trimmings, Cheapest and Best Side Lights in the Market, Awning Hardware. Specialties in Brass made to Order.

THE SHELTON BRASS HARDWARE CO., Birmingham, Conn.

Send for Illustrated Catalogue.

NEW YORK WAREHOUSES: 95 Chambers St.

CHICAGO WAREHOUSES: 177 Lake St.

## D. S. JENKINS,

Brockton, Mass.,

MANUFACTURER OF

## TACKS, BRADS, &c.

Being the largest concern outside the combination, we are prepared to supply the Trade with a full line of goods. All goods made from best of stock. Satisfaction guaranteed. Samples sent free. Send for price list. Goods delivered in Boston, New York, Philadelphia, Baltimore and Chicago.

## WIRE STAPLES

IN EVERY VARIETY

Chisel & Lancet Boardman Point. Blind Staples a Specialty.

Send for Samples and Prices.

## BINGHAMTON STAPLE WORKS

BINGHAMTON, N. Y.

Hoag & Titchener, Props.



**THOS. FIRTH & SONS, Lim'd,**  
SHEFFIELD,  
**CRUCIBLE CAST STEEL.**

**JERE ABBOTT & CO.,**

Agents and Importers of

**SWEDISH IRON,**

35 Oliver St., Boston. 23 Cliff St., New York.

**GUSTAF LUNDBERG,**

AGENT FOR

**N. M. HÖGLUND'S SONS & CO.,**

OF STOCKHOLM,

**Swedish & Norway Iron**

38 KILBY STREET, BOSTON.

ALBERT POTTS, Philadelphia Agent, 234 & 236 N. FRONT STREET.

**PAGE, NEWELL & CO.,**

139 Milk Street, Boston.

**IRON, STEEL AND METAL MERCHANTS,**

IMPORTERS OF

**SWEDISH IRON,**

Including Charcoal, Siemens-Martin and Bessemer Productions, Bars, Shapes, Rods, Billets, Blooms.

DELIVERIES MADE AT ALL PROMINENT AMERICAN, CANADIAN AND PROVINCIAL PORTS.

**SWEDISH IRON.** **CHARLES G. LUNDELL,**  
No. 7 Exchange Place,  
BOSTON, MASS.

**SWEDISH IRON AND STEEL**  
**LEWANDER & CO.,**  
Agents for L. G. BRATT & CO., of Gothenburg, Sweden.

(NORWAY) Main Office: 12 Post Office Square, Boston, Mass.

**CHEMICALS AND APPARATUS**

FOR THE ANALYSIS OF

**ORES, IRON, STEEL, FUEL, FLUXES, FURNACE GASES, &c.,**

Our Specialty. Being direct Importers and Manufacturers we can offer superior inducements.

**EIMER & AMEND,** Nos. 205 TO 211 THIRD AVENUE,  
NEW YORK. Eighteenth Street Station Elevated Railroad

Illustrated Catalogue Mailed on Application.

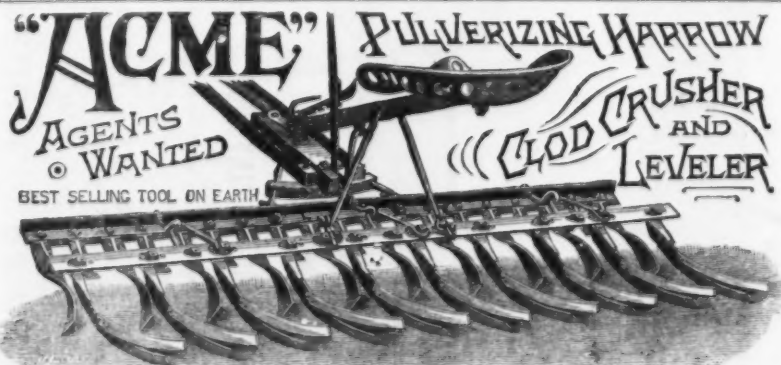
**SWEDISH AND NORWAY IRON,**

Direct from the Works.

**ALRUTZ & CO.,** Stockholm and London.

—REPRESENTED BY—

**MAGNUS TROILIUS, E. M.,** 104 SOUTH SIXTH STREET (Ledger Building),  
Philadelphia.



Subjects the soil to the action of a Steel Crusher and Leveler, and to the Cutting, Lifting, Turning Process of Double Gages of Cast Steel cutters. Immense cutting power. Crushing, Leveling and Pulverizing performed at the same time. Entire absence of Spikes or Spring. Teeth avoids pulling up rubbish. Only Harrow that cuts over the entire surface of the ground. Sizes, 3 to 15 ft. wide. With and without sulky attachment. We deliver free at Distributing Depots. There is a demand for the "ACME" in every agricultural county in the United States, and it meets with ready sale. Send for pamphlet containing thousands of testimonials from 48 States and Territories.

Branch Office, **HARRISBURG, Penn.** **NASH & BRO.,** Manufacturing and Principal Office,  
MILLINGTON, New Jersey.  
N. B.—"TILLAGE IS MANURE" and other essays sent free to parties who NAME THIS PAPER.

—THE—  
**SHUMARD SASH BALANCE CO.,**  
OFFICE, 1114 North E Street.

**Shumard Sash Balance.**

An article that entirely dispenses with Weights, Cords and Pulleys. Requires no boxes in Window Frames. Can be attached to any window, old or new. Holds the Sash at any height desired, and requires but a slight pressure to move it up or down. Are easily attached by an ordinary carpenter. Are the only durable, practical substitute for weights, and are appreciated on sight. Send for circular.

**SHUMARD SASH BALANCE CO.,**  
Richmond, Ind.

**WESTERN ELECTRIC COMPANY,**

227-251 So. Clinton St., Chicago. 70-76 Trinity Place, New York.

**COMPLETE AND PERFECT ELECTRIC LIGHTING SYSTEM,**

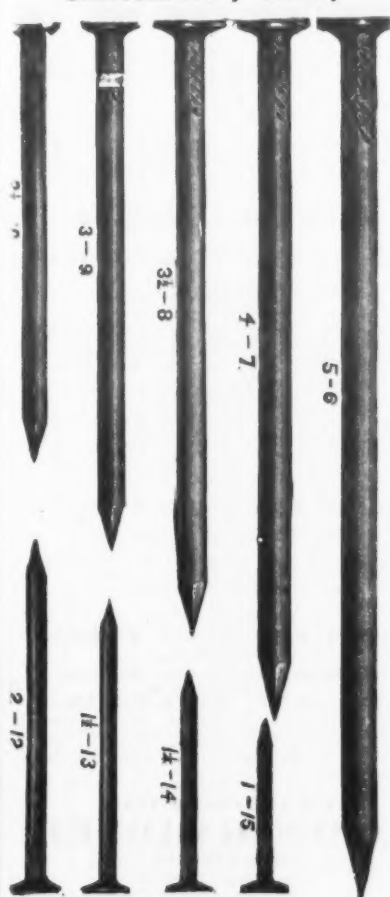
For Central Stations or Isolated Plants. All kinds of Electrical Apparatus and Supplies.

**WELDED CHROME STEEL & IRON (5 PLY) FOR SAFES VAULTS &c.**  
**CHROME STEEL WORKS BROOKLYN, E.D.N.Y.**



**THE HP NAIL CO.,**

CLEVELAND, OHIO,



MANUFACTURERS OF

**WIRE NAILS**

OF ALL KINDS

Barbed or Plain Steel, Iron and Brass Nails, Cast Steel Wire Brads, Cast Steel Wire Finishing Nails, Cigar Box Nails, Esutcheon Pins, Wagon Nails, Clinch Nails, Finge Nails, Wire Spikes for Track, Bridge and Dock Work, Tinned Nails, Galvanized Nails.

**ATLANTA RUBBER CO.,**

26 Marietta St., Atlanta, Ga.

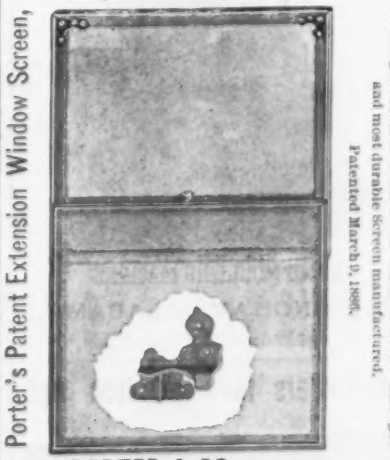
**Rubber Belting, Pack-  
ing, Hose, &c.**



**PURE OAK LEATHER BELTING,**

Oil Tan and Raw Hide Lace Leather, and all  
Kinds of Mill Supplies.

Send for Catalogues and Discounts.



**E. N. PORTER & CO., BURLINGTON, VT.**

**THE WELPINE FLEXIBLE JET-AND SPRAY HOSE NOZZLE.**

All Rubber! Indestructible! Solid Stream instantly changed to spray by simply compressing the Soft Rubber Tip. The enlarged opening at the Tip produces spray, widely diffused or closely concentrated at will of user. The cheapest and best for Carriage Washing, Greenhouses, Gardens, Street Watering, &c. Sells at eight. Send for Circular. Enclose 3 cents for sample by mail to trade only.

**THE HARTFORD RUBBER WORKS, Hartford, Conn.**  
Rubber Goods for Mechanical purposes. Fine and accurate mould work to order.



SEND FOR CIRCULAR AND PRICES.

**WITHINGTON & COOLEY MFG. CO.,**  
MAKERS OF HOES, FORKS, RAKES AND SNATHS,  
JACKSON, MICH.

**THE MATHER DYNAMO-ELECTRIC MACHINE**

FOR **NICKEL-PLATING.**

No Reversing, No Water,  
No Noise, No Spark.

SATISFACTION GUARANTEED.

MANUFACTURED BY

THE

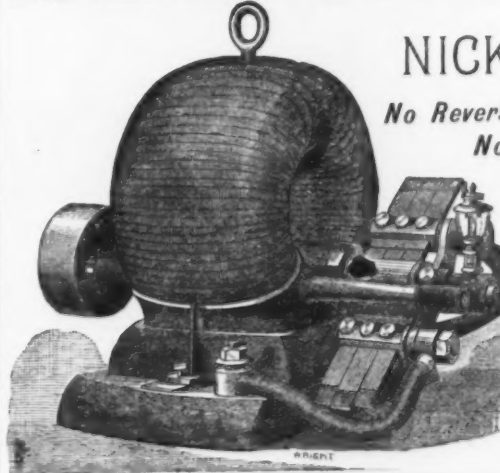
**EDDY ELECTRIC MFG. CO.**

SUCCESSORS TO

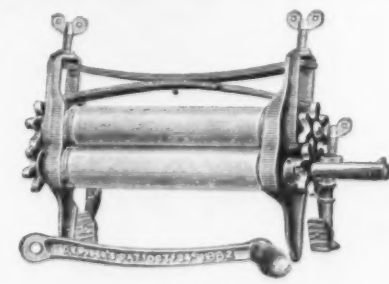
**A. H. EDDY,**

Hartford, Conn.

(SEND FOR CIRCULAR.)



They are the Handsomest  
Winger made,



and we offer them as a  
Superior Article.

**'THE AMERICAN.'**

We have recently greatly improved our Wringers and now offer a line of machines of a superior quality to any made. We have strengthened the frames where they required, and guarantee them to wring as dry and unconditionally to TURN EASIER than any wringer made. The frame is galvanized in the best manner, and the Shafts are of Steel. We use enameled handles on all our Wringers, which are not effected by alkali or water.

Send for Catalogue and Prices.

**THE TRIUMPH WRINGER CO., Keene, N. H.**

**SOMETHING NEW!**

**The Diamond Lock Faucet,**

PATENTED APRIL 10, 1885.

**John Sommer's Son,** Manufacture of John Sommer's Wooden Faucets  
Surpasses any Faucet in the Market  
8, 10 and 12 Pearl St., Newark, N. J.



1st. A Lock Faucet that cannot be placed, will not leak, and keeps tight.  
2d. A Faucet that can be driven and will not split, as it has a solid head, its working parts being on the top.  
3d. Made from selected hard rock maple polished, all metal parts used in its construction being pure black tin, which, as commonly known, will not corrode or affect any kind of liquid.

**LIESCHE'S**

**Burglar-Proof Sash Lock**

AND

**Automatic Window Holder.**

Cheapest, Strongest and Only Practical Automatic Lock and Holder on the Market.

SAMPLES FREE TO THE TRADE

**J. R. CLANCY Syracuse N. Y.**



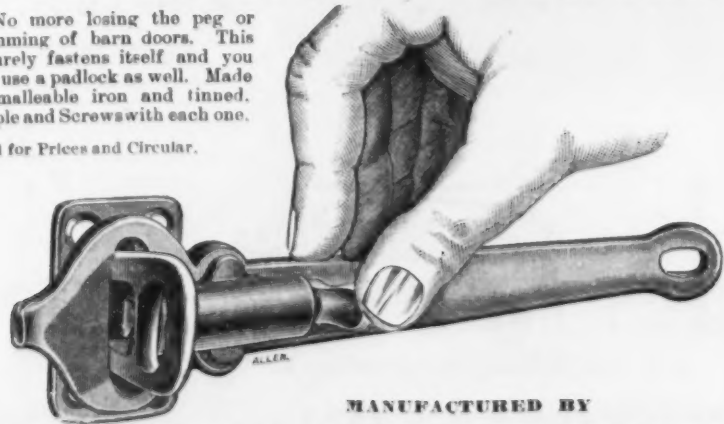


**FRUIT WINE**  
**& JELLY PRESS**  
**SAUSAGE STUFFER**  
**MOLASSES**  
**SELF MEASURING FAUCET**  
**ENTERPRISE MFG. CO.**  
**THIRD & DAUPHIN STS.**  
**PA.**  
**Mrs. Potts**  
**SELF WEIGHING CHEESE KNIFE**  
**COLD HANDLE SADD IRONS**  
**SOLD BY ALL HARDWARE DEALERS**  
**SEND FOR ILLUSTRATED CATALOGUE**  
**SMOKED**  
**BEEF SHAVES**  
**MEAT CHOPPER**  
**BUNG HOLE**  
**BORER**  
**TOBACCO**  
**& ROOT CUTTER**

**THE "BUCKEYE" JUNIOR LAWN MOWER**  
 The lightest running, best and cheapest Lawn Mower in the Market.  
 10, 12, 14 and 16 inch cut.  
 Also Manufacturers of the  
 Buckeye Hose Reel and Lawn Sprinkler, Buckeye Wrought Iron Fencing, Buckeye Force Pump, AND Iron Turbine Wind Engines.  
 Send for Circular and Price List.

## THE "SECURITY" DOOR HASP

No more losing the peg or slamming of barn doors. This security fastens itself and you can use a padlock as well. Made of malleable iron and tinned. Staple and Screws with each one.  
 Send for Prices and Circular.



MANUFACTURED BY  
**SWEET & CLARK MFG. COMPY, TROY, N. Y.**

## ELECTRIC LIGHT.

**BRUSH ELECTRIC CO.,**  
 CLEVELAND, OHIO.

### LANE'S MEASURING FAUCET.

Price, \$3.00.  
 For Light or Heavy Molasses, Oils, Varnishes or other Fluids.

We warrant these Faucets to be as represented, measuring correctly and working more easily in heavy molasses than any Measuring Faucet in the market. No groove can afford to be without them, for they save time, and "time is money." They insure perfect cleanliness, requiring no tin measure or funnel, no collect dirt and draw flies. They do not drip. They prevent all waste, as no molasses or other fluid can pass except when the crank is turned. They are the embodiment of simplicity, and consequently they are always in order. They work easily in the heaviest molasses. They are warranted to measure correctly, according to U. S. Standard.

MANUFACTURED EXCLUSIVELY BY  
**LANE BROS., Poughkeepsie, N. Y.**  
 General Agency, **JOHN H. GRAHAM & CO., 113 Chambers St., New York**

**FERRACUTE MACHINE CO.,**

BRIDGETON, NEW JERSEY, U. S. A.,

**Presses, Dies AND ALL Sheet Metal Tools.**

Send for Illustrated Catalogue with sizes, weights and prices of two different kinds of Presses and Tools for

Cans, Tinware, Silver and Brass Goods, Locks, Hardware and other Iron Goods. A new line of Punching Presses just out.

## B. KREISCHER & SONS, FIRE BRICK.

BEST AND CHEAPEST.

ESTABLISHED 1845.

Office, foot of Houston Street, East River, NEW YORK.

**NEWTON & CO.,**  
 ALBANY, N. Y.,  
 MANUFACTURERS OF BEST QUALITY

## FIRE BRICK

And STOVE LININGS.

**M. D. VALENTINE & BRO.,**

MANUFACTURERS OF

## FIRE BRICK

And FURNACE BLOCKS.

DRAIN PIPE AND LAND TILE,  
 Woodbridge, N. J.

## BORGNER & O'BRIEN, FIRE BRICK

MANUFACTURERS

Edge Pressed Furnace Blocks,  
 Clay Retorts, Tiles, &c.

Twenty-third Street, Above Race, PHILADELPHIA.  
 Twenty years' practical experience.

ESTABLISHED 1848.

**TROY FIRE BRICK WORKS,**

Troy, N. Y.

**James Ostrander & Son,**

MANUFACTURERS OF

**FIRE BRICK,**

Tiles, Blast Furnace Blocks, &c., and in a Special Department Linings for Stoves, Ranges and Heaters of superior quality. Minors and dealers in Woodbridge, N. J. Fire Clay and Fire Sand and Staten Island Kaolin.

ESTABLISHED 1864.

**JAMES GARDNER,**

SUCCESSOR TO GARDNER BROS.,

MANUFACTURER OF

**"STANDARD SAVAGE" FIRE BRICK,**

TILE & FURNACE BLOCKS,

OF ALL SHAPES AND SIZES

Miner and Shipper of "Mount Savage" Fire Clay.

WORKS, Ellerslie, Allegheny Co., Md.

MAIN OFFICE, Cumberland, Md., P. O. Box 93.

BRANCH OFFICE, Pittsburgh, Pa., P. O. Box 373.

S. M. Hamilton & Co., Agents, Baltimore, Md.

**UNION MINING COMPANY.**

**MOUNT SAVAGE FIRE BRICK.**

EDWARD J. EITING, Agent

Eastern Penna., West New Jersey and Delaware.

222 South Third St., Philadelphia, Pa.

**BIRMINGHAM FIRE BRICK WORKS.**

All dimensions of Firebricks and Shapes.

Fire Clay for Furnaces, Coke Ovens, Boilers and Patent Grate Linings. Drain Tile, Street Paving Blocks and Fire-Proof Hollow Bricks for Buildings.

BIRMINGHAM, ALA.

**New Jersey Fire Clays.**

Paper, Wall, Retort, Glass Pot, Stove

Lining and Foundry Clays. Foundry and Fire Sand and Kaolin.

Orders by Car or Boat Loads promptly filled.

CHAS. S. EDGAR, Metuchen, N. J.

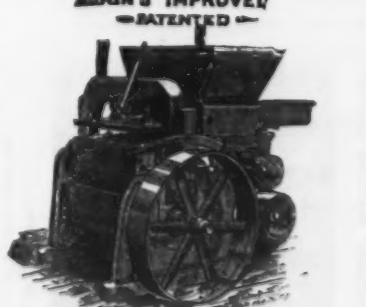
**AIKIN & LIGHTON,**

Iron City Foundry and Machine Works.

SOLE MANUFACTURERS OF

**ADON'S IMPROVED**

**PATENTED**

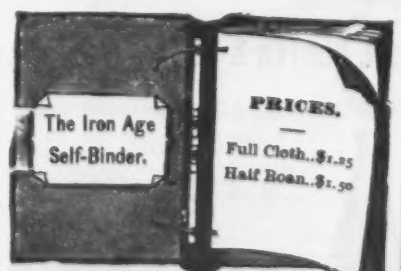


SAND MOULDING MACHINE

BIRMINGHAM, ALABAMA.

CORRESPONDENCE SOLICITED.

Self-Binders for The Iron Age.



We are now prepared to supply our subscribers with an excellent self-binder for their papers, a cut of which is annexed. We call attention to the low prices at which it is offered. Address all orders to  
**DAVID WILLIAMS,**  
 66 and 68 Duane Street, New York.

## SNELL MFG. CO.,

Established 1790.

FIRST PREMIUM AWARDS.

MASSACHUSETTS,

CENTENNIAL EXHIBITION,

1841. 1848. 1850.

PHILADELPHIA, 1876.

INTERNATIONAL EXHIBITION

PARIS, 1878.



Manufacturers of the celebrated Snell's Ship Augers, Ship Auger Pattern Car Bits, Ship Auger Bits and Ship Augers with extra length twist, for Bridge Builders, Dock Builders, Railroad use, and especially designed for Car Builders and Millwrights, both with and without screws. These goods are produced from a special steel by new and improved machinery, the labor being performed by skilled mechanics, and they are of superior quality and finish, and fully warranted in every particular, and are of the highest standard of perfection attainable.

Snell's Celebrated Extra Cast Steel Auger Bits and Russell Jennings' Pattern Auger Bits.

Snell's Warranted Superior Cast Steel Car Bits, used by all the large car manufacturers of the United States, and have the highest reputation.

Snell's Patent Angle and Upright Boring Machines and Boring Machine Augers.

Snell's Carpenters' Nut Augers, Millwright Augers, Cuban Ring Augers, Long Rafting Augers, Gas Fitters' Augers and Kentucky Post Augers.

Snell's Improved Screw Driver Bits (Clark's Pattern), Taper Pod Bits, Dowelling Bits, Countersink Bits, Plug Bits, Nail Sets and Gimlets.

All varieties of Machine Augers and Bits made to order.

**BATES, WILSON & CO.,**

SOLE AGENTS,

80 Chambers St., NEW YORK.



## "CLIMAX"

Barn Door Hangers,

## "ZENITH"

Barn Door Hangers,

FOR WOOD TRACK.

Moore's Freight Car

Door Hangers,

Baggage Car Door

Hangers,

RAILROAD HANGERS,

Parlor Door Hangers.

Send for New Price Lists.

**Moore Mfg Co.,**

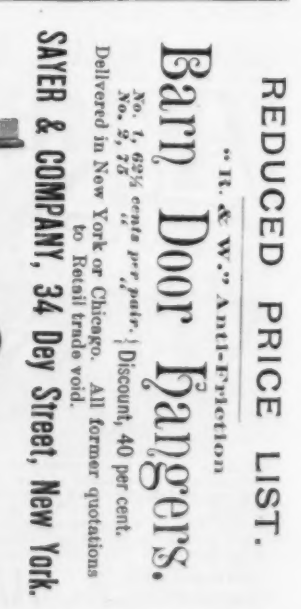
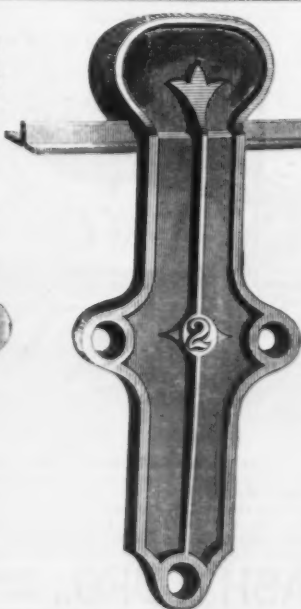
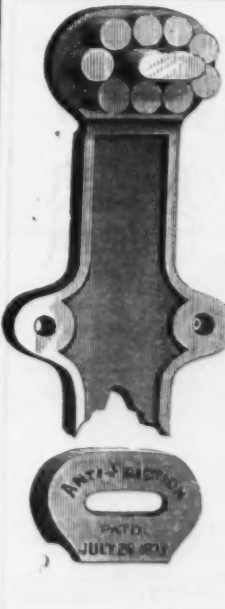
165 Lake St.,

CHICAGO.

Henry B. Newhall Co.,

105 Chambers St., N. Y.

Eastern Agents.



## AMERICAN CUTLERY CO.,

MANUFACTURERS OF



**FINEST**

**QUALITY**

**CARVERS**

## TABLE CUTLERY,

BUTCHER, COOK AND CARVING KNIVES.

177 to 191 Mather Street,

CHICAGO.

WRITE FOR CATALOGUES.

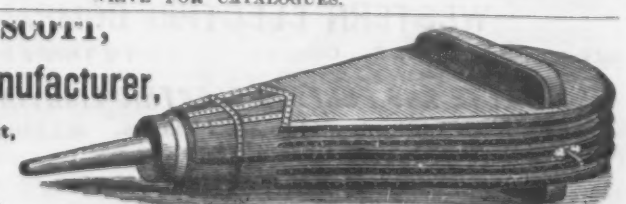
**GEO. M. SCOTT,**

**Bellows Manufacturer,**

Johnson Street,

Cor. 23d St.,

CHICAGO, ILL.









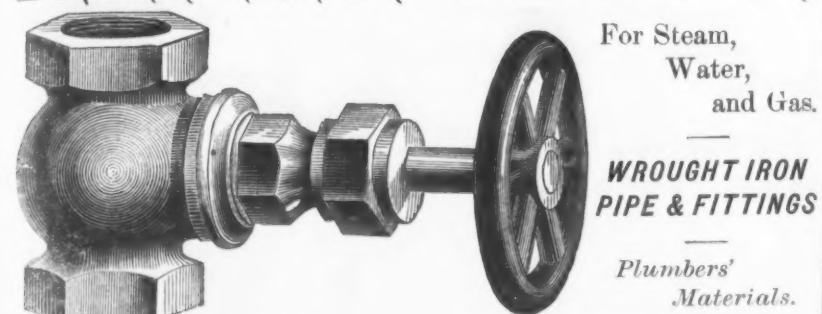




# McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

## BRASS COCKS AND VALVES



For Steam,  
Water,  
and Gas.

WROUGHT IRON  
PIPE & FITTINGS

Plumbers'  
Materials.

Factory, Paterson, N. J.

56 John Street, N. Y.

Our new Illustrated Catalogue and Price List is now ready, and will be sent to the Trade with their first order, or by express, if desired, before ordering.

**RIVETS**  
OF EVERY  
DESCRIPTION, FIRST QUALITY.

**W.P. TOWNSEND & CO.**  
NEW BRIGHTON, PA.

Wm. H. HASKELL, President. E. S. MASON, Treasurer. D. A. HUNT, Agent.

# WM. H. HASKELL CO.,

MANUFACTURERS OF

**GIMLET POINT  
COACH SCREWS**

Bolts, Cold-Punched Nuts & Washers.

SUITABLE FOR MACHINERY OF ALL KINDS.

Office and Work : 277 Main St., PAWTUCKET, R. I., U. S. A.  
**HENRY B. NEWHALL CO., Agents,**  
105 Chambers St., New York. 47 Pearl St., Boston.

**F. ARMSTRONG, Bridgeport, Conn.**

Water Gas AND Steam Fitters Tools.

CATALOGUES AND PRICE LISTS FREE ON APPLICATION.

**The American Nail Machine Co.,**  
MANUFACTURERS OF  
AMERICAN PATENT  
**IMPROVED CUT NAIL MACHINES,**  
AUTOMATIC NAIL SELECTORS and NAIL  
FACTORY SUPPLIES.  
**ASHTABULA, OHIO.**  
Prices and particulars furnished on application.

**WM. McILVAIN & SONS,**  
MANUFACTURERS OF  
**BOILER PLATE**  
AND  
CHARCOAL BLOOMS.  
Locomotive, Fire Box, Flange and Shell  
Iron; Plate for Bridges and Girders; Tank  
and Stack Iron; Boat Plate and Iron for  
Wrought Pipe; Plate Iron for Fire and  
Burglar Proof Safes.

Plates 1 1/4 inch thick to No. 14.  
30 feet long.  
70 inches wide.

# C. A. MOORE, Pres. E. L. MAXWELL, V.-Pres. H. S. MANNING, Sec. and Treas. HARRIS TABOR, Supt.

## THE TABOR MANUFACTURING CO.,

SOLE MANUFACTURERS OF

**Tabor Steam Engine Governor.**  
Patented April, 1883, and December, 1884.  
Will regulate as closely as the best automatic cut-off engine.  
Perfectly adapted to every type of Stationary and Port-  
able Engine. Fitted with Speed Adjuster, Sawyer's  
Lever and Automatic Safety Stop.  
SIMPLE, SENSITIVE AND DURABLE.  
ALL PARTS INTERCHANGEABLE.  
SEND FOR SPECIAL CIRCULARS AND PRICE LISTS.  
OFFICE AND  
SALESROOM, 113 Liberty Street, New York City.

**COVERT MANUF'G COMPANY,**  
West Troy, N. Y.,  
Manufacturers of COVERT'S Cele-  
brated Harness Snaps, Swivel Snaps,  
Open Eye Bit and Chain Snaps,  
Snap and Thimble for Horse and  
Cattle Ties; ROPE GOODS,  
consisting of Web and Rope  
Halters, Rope Horse and  
Halter, Rope Horse and  
Ties, &c. Breast Chains, Heel Chains, Chain Cow Ties, Martingale  
Chains, Rein Chains, Post Chains, Back or Cart Chains, Log Chains,  
Stake Chains, Trace Chains. Also STUDD. CABLE AND COIL CHAIN.  
CHAINS OF ALL KINDS MADE FROM SAMPLE OR DRAWING.  
PATENT ADJUSTABLE  
SOLDERING IRONS.  
Send for Illustrated Catalogue  
and Price List

**G.A. Crosby Co.**  
MANUFACTURERS OF  
**PRESSES, DIES,**  
AND  
**SPECIAL MACHINERY**  
FOR  
SHEET METAL WORKERS  
MACHINERY  
AND TOOLS FOR MEAT, FISH, FRUIT & VEGETABLE PACKERS

259, 261, 263, RANDOLPH ST. CHICAGO, U.S.A.

**North Wayne Tool Co.,**  
HALLOWELL, MAINE,  
W.H. CARTER'S PATENT NEEDLE HAY KNIFE.  
PAT. APR. 29, 1884.  
IMPROVED BY M.M. BARTLETT.  
Improvement Patented April 28, 1885.

**BROCK'S PATENT DROP FORGED CHAIN PIPE WRENCH.**  
MADE ENTIRELY OF BAR STEEL.  
Six Sizes; adapted for Pipe from 1/2 to 14 inches diameter.  
Each number will fit a range of sizes equal to  
six or more pairs of common tools, while it will  
outwear an equal number of any kind.  
All parts are interchangeable, and can be read-  
ily renewed.  
Jaws are hardened to a saw temper, and can be  
sharpened with a file.  
Does not crush pipe; has a quick grip; never  
slips; chain will not unhitch while in use, but  
can be instantly released.

**J. H. WILLIAMS & CO.,**  
Manufacturers of Every Description of Iron and Steel Drop Forgings,  
9 RICHARDS ST. (Near Hamilton Ferry), BROOKLYN, N. Y.

**The Siddall Patent  
HOSE AND PIPE COUPLING,**  
For Connecting all Sizes of Hose,  
Block Tin and Lead Pipe.  
SIMPLE. CONVENIENT. DURABLE.  
HOSE, 3-4 INCH, per dozen, - - - \$7.50  
BEER AND ALE, per dozen, - - - 7.50  
Discount on Application.

**RAND, HARMER & CO.,**  
11th and Filbert Sts., - - PHILADELPHIA, PA.  
**IRELAND MFG. CO., Cincinnati, Ohio,**  
SOLE MANUFACTURERS OF  
**THE MORRIS PAT. SASH LOCK,**  
**THE MORRIS PAT. DOOR KNOB,**  
And REVERSIBLE RABBETED MORTISE DOOR LOCK,  
PATENT PENDING.  
Also General Line of Builders' Hardware.  
Catalogues and Lists Furnished on Application.

# P. BLAISDELL & CO.,

Manufacturers of

**MACHINISTS' TOOLS,**  
Blaisdell's Patent Upright Drills,  
With Quick Return Motion.  
Engine Lathes, Planers, Boring Mills,  
Gear Cutters and Hand Lathes.  
WORCESTER, MASS., U. S. A.

**ALFRED BOX & CO.**  
312, 314, 316 Green St.,  
PHILADELPHIA, PA.  
Manufacturers of  
Box's Pat. Double  
**Screw Hoists.**  
13,000 in use.  
Many have done hard  
continuous duty years  
without a single part  
being renewed. This is the  
key of our success. They  
have built up a reputation  
themselves that cannot be  
approached. Our improved  
**Radial Drills**  
are also assuming the same  
standard.

# G. E. BRETTELL,

Water Street, Rochester, N. Y.

Improved Planers a Specialty; 20 X 20, 22 X 22, 24 X 24  
26 X 26, 30 X 30, 36 X 36, to planer  
any desired length. Send for  
Description and Prices before  
purchasing.  
Mention The Iron Age.

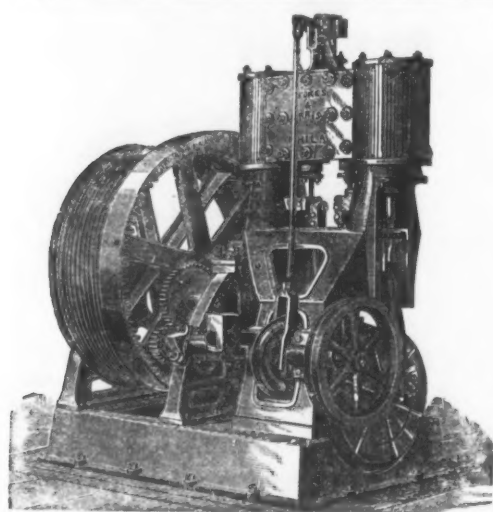
**MACHINERY FOR  
Straightening & Cutting Wire**  
Of all Sizes to any Length.  
Send for Catalogue.  
**J. N. O. ADT & SON,**  
New Haven, Conn., U. S. A.

**HOWARD IRON WORKS,**  
BUFFALO, N. Y.,  
Manufacturers of  
**BOLT CUTTERS**  
AND NUT TAPPING MACHINES,  
(Schlenker's Patent),  
Send for Illustrated Catalogue.

**THE BARTON BELL CO.,**  
East Hampton, Conn.,  
MANUFACTURERS OF  
Sleigh, Hand, House, Tea and Call Bells  
In great variety.  
Illustrated catalogue on application.  
**JOHN H. GRAHAM & CO., Agents,**  
113 Chambers St., N. Y.,  
Where a Complete Stock is Maintained.

**PITTSBURGH MFG. CO.,**  
Manufacturers of Nail and Spike Machines, Bolts,  
Nuts, Washers, Rivets, &c. Castings, Forgings and  
Blacksmith Work promptly attended to.  
Office and Works: Railroad St. near 20th, Pittsburgh, Pa.





**STOKES & PARRISH  
MACHINE CO.,  
PHILADELPHIA.**

**ELEVATORS,**  
Passenger and Freight, Steam Hy-  
draulic and Belt Power.

**Hoisting Machinery**  
For Mines, Dock Use and Inclined  
Planes. All kinds of Hoisting Ma-  
chinery a Specialty.

**BLAST FURNACE  
Hoisting Engines,**  
With Vertical or Horizontal Cylinders,  
for Handling Stock to Top of Stack  
with One or Two Platforms.

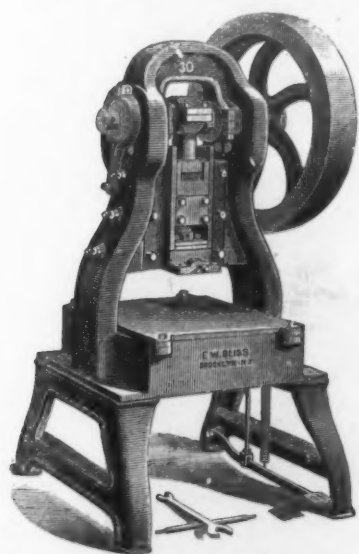
WORKS AND OFFICE,  
3001 Chestnut St., Philadelphia.  
NEW YORK OFFICE,  
95 and 97 Liberty Street.

**E. W. BLISS CO.,**

MANUFACTURERS OF

**Presses and Dies and Special Machinery**

For Working all Shapes and Classes  
of Sheet Metal.



**DOUBLE  
SEAMING MACHINES**

FOR  
Round, Square and Oval Cans.

**HAND AND POWER  
Circular Shears.**

*Foot and Power  
Squaring Shears.*

WORKS: Plymouth, Pearl and John Streets,  
BROOKLYN, N. Y. OFFICE: 17 Adams Street,  
BROOKLYN, N. Y.



**THE STOCK, WORKMANSHIP, DESIGN AND FINISH**

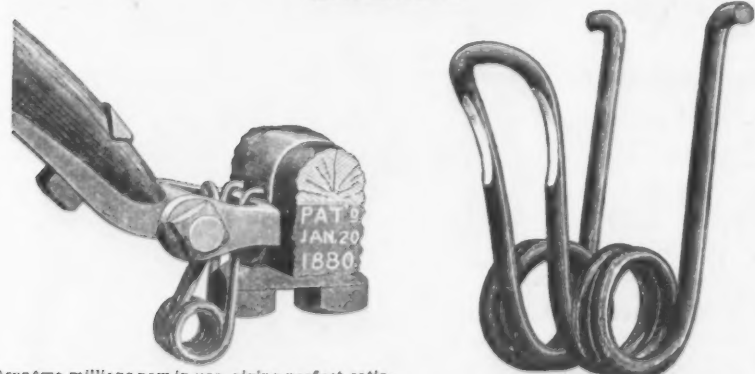


**AND WE SO WARRANT THEM.**

WE ALSO MAKE A SPECIALTY OF  
**TOOLS, FIXTURES AND GAUGES**  
For Manufacturing INTERCHANGEABLE Work, Such As  
Guns, Pistols, Sewing Machines, &c.

**R. H. BROWN & CO.,**  
NEW HAVEN, CONN.

**FROST'S PATENT THILL SPRING.**  
(ANTI-RATTLE.)



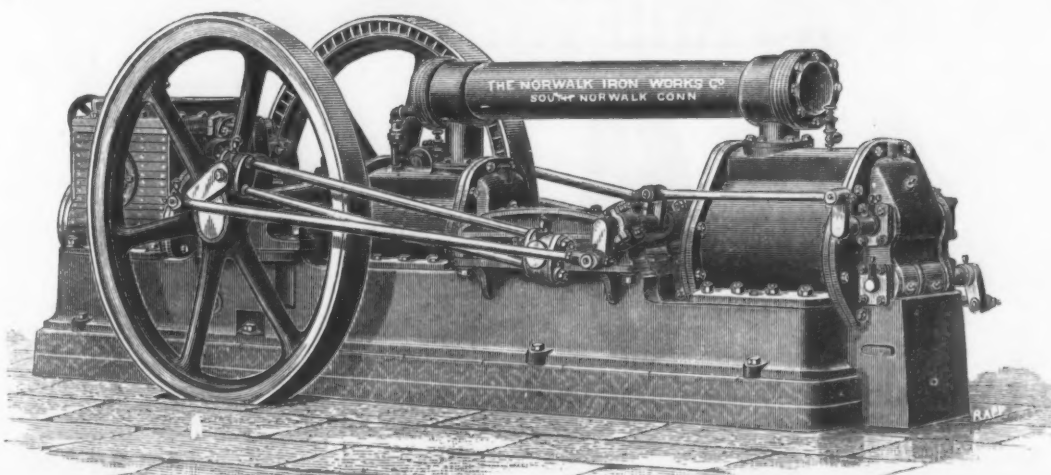
Over two millions now in use, giving perfect satis-  
faction. Does not show when in the carriage.

The above Cut shows the Wear of a Spring  
that has been in constant use for over one year.

Every pair warranted for one year, and NO RATTLE. I take all the risk, you take none  
Send for Circular and Price List to

**STILES FROST, Sole Manufacturer,**  
276 Devonshire Street, BOSTON, MASS.

**Air Compressors.**



**THE NORWALK IRON WORKS CO., South Norwalk, Conn.**

**WALKER MFG. CO.**

**SHAFTING,  
HANGERS,  
PULLEYS.**

*Pulley Castings and  
Machine-Molded  
GEARING*

A SPECIALTY.

Cleveland, - Ohio.

Estimates furnished. Write for  
Gear and Price Lists A.



Established in 1874. 24 and 26 West Street, Cleveland, O.  
**CLEVELAND TWIST DRILL CO.,** 101 Chambers Street, New York.  
85 Queen Victoria St., London, Eng.

**Ludlow Valve Mfg. Co.,**

OFFICE AND WORKS:

938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.

**VALVES.**

Double and Single Gate, 1/4 in. to 48 in.—outside and inside Screws, Indicator, &c.  
For Gas, Water, Steam and Oil. Yard and Wash Hydrants. Send for Circular. Also

**FIRE HYDRANTS.**

**Morse Twist Drill & Machine Co.,** NEW BEDFORD, MASS.

Manufacturers of Morse Pat. Straight-Lip Increase Twist Drills,

Bit Stock Drills, Solid and Shell Reamers, Drill Grinding Machines,

Milling Cutters,

Beach's Patent Self-Centering Chucks, and Special Tools to Order.

ALL TOOLS EXACT TO WHITWORTH STANDARD GAUGES.

**MANNING, MAXWELL & MOORE,**

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S

Manufacture of Patent Machine Relieved Nut, Hand,  
Blacksmith and Machine Screw Taps, Screw Plates, Tap  
Wrenches and Patent Relieved Pipe Taps and  
Pipe Reamers; also of Solid Bolt and Pipe Dies.  
Furnished in U. S. Standard and Whitworth  
shape of threads.

111 Liberty Street, NEW YORK.

**PECK'S PAT. DROP PRESS**

BLAST FORGES

STEEL & IRON DROP FORGINGS

Drop Dies and Special Machinery.

BEECHER & PECK, NEW HAVEN CONN.

111 Liberty Street, NEW YORK.

**PRENTISS' PATENT VISES,**

ADJUSTABLE JAW,

Stationary or Pat. Swivel Bottoms,

Adapted to all Kinds of Vise Work, also

"PEELLESS" SWIVEL PIPE GRIP,

FITS ANY VISE. SOLD BY THE TRADE.

**PRENTISS VISE CO.,**

23 Day St., New York,

SOLE PROPRIETORS. SEND FOR CIRCULAR.

111 Liberty Street, NEW YORK.

**PECK'S PAT. DROP PRESS**

BLAST FORGES

STEEL & IRON DROP FORGINGS

Drop Dies and Special Machinery.

BEECHER & PECK, NEW HAVEN CONN.

111 Liberty Street, NEW YORK.

**PRENTISS' PATENT VISES,**

ADJUSTABLE JAW,

Stationary or Pat. Swivel Bottoms,

**RIVAL  
STEAM PUMPS**  
THE  
CHEAPEST  
AND THE  
BEST  
FOR  
HOT & COLD  
WATER.  
\$35.00  
AND  
UPWARDS.

15 SIZES  
MANUFACTURED BY  
JOHN H. MCGOWAN & CO.  
CINCINNATI

**DEAD-STROKE POWER HAMMERS**

CONSTRUCTION IMPROVED. Prices Reduced. Seven Sizes. 5 to 250 Pounds.

DIENELT & EISENHARDT,

MAKERS,

1310 Howard St., Philadelphia.

**A. H. MERRIMAN,**

MERIDEN, CONN.

Manufacturers of all Descriptions of

**PRESSES.**

Catalogue and prices sent on application.

**Barnes' Pat. Upright Drills.**

20-inch Swing, with both  
Worm and Lever Feed.

**Barnes' Patent Engine Lathe**

15-inch swing, 6-foot or 8-foot  
Bed. Those machines are made  
a specialty in our factory, they have  
advantages not found in other ma-  
chines in this line. It will be  
particular desiring to purchase, or  
know more about this class of ma-  
chines, to send for full description  
and prices.

**W. F. & JOHN BARNES,**

19 Ruby St., Rockford, Ill.

**E. E. GARVIN & CO.**

Manufacturers of Machinists' and Iron Workers' Tools, Lathes, Planers, Milling Machines and Drills

Special Tools for all kinds of manufacturing to order.

We received Gold Medal for our  
NEW UNIVERSAL MILLER  
at N. O. Exposition. (See cut.)

**Universal Milling Machine.**

**Gear and Rack Cutting, Milling and  
Index Drilling to Order.**

139 to 143 Centre St., New York.



Machinery, &c.

Hydrostatic Machinery,

JACKS, PRESSES, PUNCHES, ACCUMULATORS, PUMPS, VALVES, FITTINGS, &c.

POLISHING AND BUFFING MACHINERY, WOOD WHEELS, &c. Patent Punches and Shears.

WATSON & STILLMAN, 470 B Grand St., N. Y.

Shapers, Turret Lathes and Drills.

LODGE, DAVIS & CO.,

CINCINNATI, OHIO.

Lodge, Barker & Co.

Write for Illustrated Catalogue and Prices. IT WILL PAY YOU.

Established 1867.

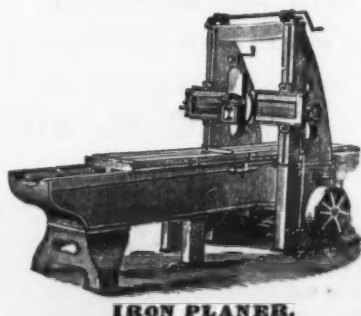
E. Harrington, Son & Co., Works and Office, Cor. N. 15th St. & Penn. Ave., PHILADELPHIA, PA., U. S. A., Manufacturers of

Patent Extension LATHES, Iron Planers, BORING MILLS DRILLS,

And a variety of other Machinists' Tools. Patent Double Chain Screw Pulley Blocks, unrivaled for durability, safety and power. Patent Double Chain Quick-Lift Hoists, with brake for quick and easy lowering. Circulars furnished.



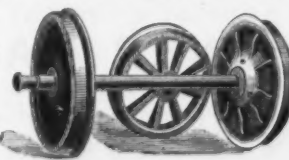
EXTENSION LATHE.



IRON PLANER.

Knoxville Car Wheel Co.

Manufacturers of CHILLED WHEELS OF ALL KINDS, With or Without Axles, KNOXVILLE, TENN.



THE CELEBRATED Carter County Cold Blast Charcoal Iron IS USED EXCLUSIVELY BY THIS COMPANY

J. M. SCHOONMAKER.

MANUFACTURER AND SHIPPER OF

CONNELLSVILLE COKE

Capacity of Mines, 2500 Tons Daily.

Siding connections with all lines of Railroads.

Office, 120 Water Street PITTSBURGH, PA.

STEAM

PUMPS

SEND FOR PRICES. VALLEY MACHINE CO. EASTHAMPTON, MASS.

Machinery, &c.

William Sellers & Co.,

ENGINEERS,

PHILADELPHIA,

MAKERS OF

MACHINE TOOLS

FOR WORKING IRON AND STEEL.

Steam Hammers; Riveting, Bending and Plate Planing Machines; Punches and Shears; Lathes; Drilling, Boring, Slotting, Shaping and Planing Machines, &c., &c.

Improved System of Shafting for Transmitting Power.

Specifications, Photographs and Prices Furnished on Application.

BRANCH OFFICES.

79 Liberty Street, New York City, Colorado Springs, Colorado.

SOUTHWARK FOUNDRY AND MACHINE CO.

ENGINEERS AND MACHINISTS,

WASHINGTON AVE., and FIFTH ST., PHILADELPHIA, PA.

PORTER-ALLEN and SOUTHWARK ENGINES, BOILERS and TANKS, BLOWING ENGINES, BESSEMER CONVERTERS, GAS APPARATUS, SUGAR MACHINERY, HYDRAULIC MACHINERY, &c., &c.

MORSE ELEVATOR WORKS.

MORSE, WILLIAMS & CO.

Successors to CLEM & MORSE.

Manufacturers and Builders of all kinds of PASSENGER and FREIGHT

ELEVATORS.

OFFICE: 411 Cherry Street. WORKS: Frankford Ave., Wilsey and Shackamaxon Streets, PHILADELPHIA. New York Office: 108 Liberty Street.

THE CLERK GAS ENGINE.

Highest Award for Gas Engines at American Institute Fair, New York, 1883.



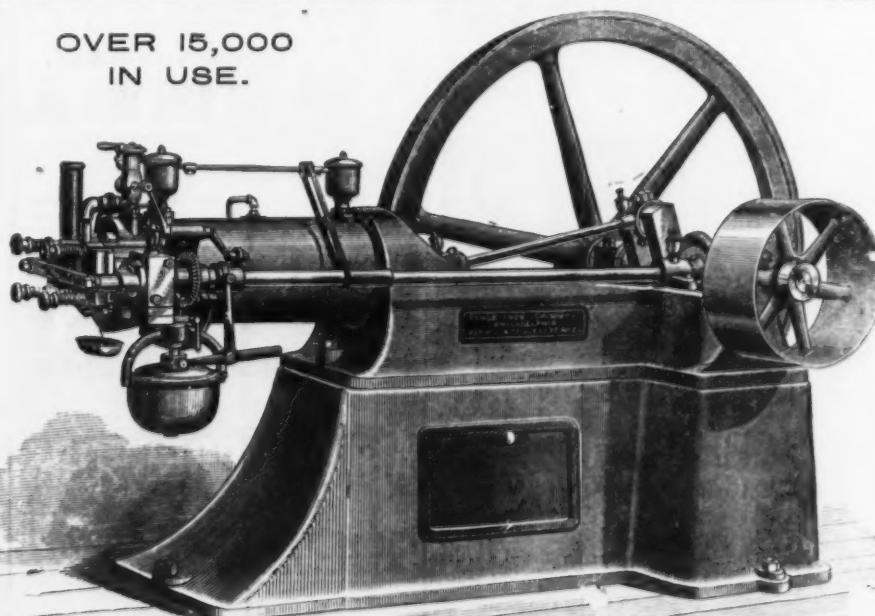
Makes an ignition at every revolution of the Fly Wheel. Is started with ease, and gives full power immediately. No danger from fire; no extra insurance nor skilled engineer required. Runs perfectly steady; only uses gas when required. Workmanship of the best description and guaranteed. Indicated power considerably larger than in any other Gas Engine of the same size, each Engine giving from 1 H.-P. to 4 H.-P. more than named. Is unsurpassed by any other Gas Engine for running any kind of machinery or electric light, arc or incandescent. Has means for regulating to suit any coal or water gas.

No Boiler, Coal, Ashes or Engineer. Made in Sizes of 4, 8, 10, 15 and 25 H.-P.

THE CLERK GAS ENGINE CO., 1012-1016 Filbert St., Philadelphia.

Branch Offices: 123 Chambers St., New York; 4 West 14th St., New York; 75 Dearborn St., Chicago.

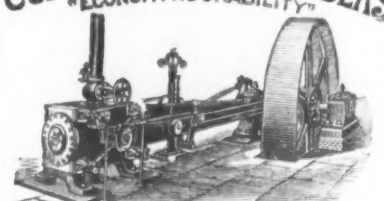
OVER 15,000 IN USE.



SCHLEICHER, SCHUMM & CO., N. E. Cor. 33d and Walnut Streets, PHILADELPHIA, 314 Randolph Street, CHICAGO.

Machinery, &c.

CORLISS ENGINE BUILDERS



MACHINISTS IRON FOUNDERS BOILER MAKERS ROBT WETHERILL & CO. CHESTER, PA.

Stow Flexible Shaft Co., Limited

2220 Pennsylvania Ave., PHILA., PA.,



PHILA. SHAFTING WORKS,

GEO. V. CRESSON, 18th & Hamilton Sts., PHILA.



STODDARD LOCK & MAN'G CO.,

104 Reade St., New York.



"OTTO" Gas Engine.

25 to 75 per cent. less gas consumption than ANY other Engine.

TWIN ENGINES.

Impulse every Revolution.

Engines & Pumps COMBINED.

For Hydraulic Elevators, Town Water Supply or Railway Service.

SPECIAL ENGINES

FOR Electric Light Work.

CHICAGO.

MAKERS OF CABLE MACHINERY FOR NEW YORK & BROOKLYN BRIDGE

LOCOMOTIVES FOR ALL KINDS OF SERVICE

BLAST ENGINES FOR IRON & STEEL WORKS

BESSEMER STEEL PLANT MACHINERY

DERRICK & WRECKING CARS

SPRING PLATE STEEL TIRED CAR WHEELS

CAST CAR WHEELS, WINE CAR WHEELS

STATIONARY ENGINES, HORIZONTAL & VERTICAL, SINGLE & IN PAIRS

HIGH PRESSURE, CONDENSING & COMPOUND, HOISTING ENGINES

CARRIAGES, DRUMS & MACHINERY

COLLIERY MACHINERY

COAL & PHOSPHATE BREAKERS WITH PATENT REMOVABLE STEEL TEETH

SCREENS & VENTILATING FANS

PUMPING ENGINES OF HIGH DUTY TYPES

CORNISH PUMPING ENGINES, PUMPS, VALVES

BOILERS OF EVERY KIND & SIZE

HANGERS, SHAFTING & PULLEYS

GEARS BOTH CAST & CUT

HEAVY MACHINERY OF ALL KINDS

SCRANTON AND WILKES-BARRE PA

NEW YORK OFFICE 112 LIBERTY ST.

GENERAL OFFICE SCRANTON PA

SOLE AMERICAN BUILDERS OF THE STOCKPORT GAS ENGINE, AND THE LIGHTHOOD DRY AIR REFRIGERATING ENGINE

H. M. BOIES, PRES. • W. H. PERKINS, SECY & TREAS. • S. BROADBENT, GEN'L SUPT. • C. W. WAITS, M. E. • D. LEAVITT, D. M. E. CONSULTING ENGR. • GEO. B. ROSS, AGENT IN N. Y.



**TUBAL SMELTING WORKS**

760 and 762 Broad Street - PHILADELPHIA.

**PAUL S. REEVES,**

MANUFACTURER OF

**Genuine Babbitt Metal**AND ALL GRADES OF  
**ANTI-FRICTION METALS.**

ESTABLISHED:

Spring Making, 1842.

Steel Making, 1845.

Norway Iron, 1871 (Re-Rolled)

**WM. & HARVEY ROWLAND,**

MANUFACTURERS OF

**Springs, Steel, Re-Rolled Norway  
Iron & Slit Norway Nail Rods.**

ADDRESS:

**FRANKFORD P. O., PHILADELPHIA.**

EAGLE FILE WORKS.

ESTABLISHED 1857.

**Madden & Cockayne File Co.,**

MANUFACTURERS OF THE OLD AND WELL-KNOWN

**WHEELER MADDEN & CLEMONS"**

BRAND OF

**FILES.**

Middletown, Orange Co.,

New York.

Buyers who appreciate the highest class of goods will do well to give this brand a trial.

**EXTRA SUPERIOR CAST TOOL STEEL**

**WELDLESS**

**COLD DRAWN**

**SMOOTH INSIDE AND OUT**

**JOHN S. LENG, 4 FLETCHER ST. NEW YORK.**

**PITTSBURGH STEEL CASTING CO.,**

26TH AND RAILROAD STS., PITTSBURGH, PA.

MANUFACTURERS OF

**Refined Bessemer Steel; Improved Steel Castings**  
UNDER HAINSWORTH'S PATENTS.We are now prepared to fill orders for refined **BESSEMER BILLETS or BLOOMS** of any desired carbon and a uniform quality.

We would call attention of consumers to the fact that we use good material, and produce a steel pronounced by competent judges equal to the best English or German spring and soft steel.

Having had twelve years' experience in the making of **STEEL CASTINGS**, we are able to refer to our customers in all parts of the United States and Canada as to the quality of our work in this line. We make castings of steel practically free from blow-holes, as soft and easily worked as wrought iron, yet stiff, strong and durable, with a tensile strength of not less than 65,000 pounds to the square inch. In short, our castings unite the qualities of steel and wrought iron.

Wheels, Pinions, Cranks, Dies, Hammer Heads, Engines and Machinery Castings of all descriptions, Railroad Frogs and Crossings, Flows, Mouldboards and Landslides.

Special attention given to Heavy Castings. We use no cast-iron in our Castings. Send for circular.

**ROP HAMMERS.**

**Punching Presses.**

**DIES AND OTHER TOOLS**

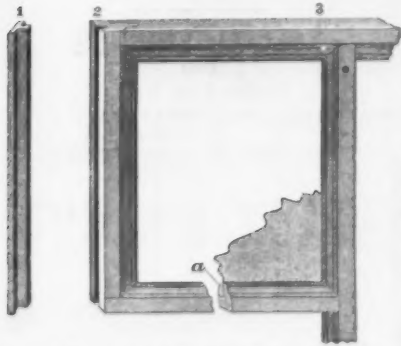
FOR THE MANUFACTURE OF ALL KINDS OF  
**SHEET METAL GOODS,  
DROP FORGINGS, &c.**

**Stiles & Parker Press Co.,**  
MIDDLETOWN CONN.

Branch Factory and Office, 59 DUANE STREET, NEW YORK.

**STUART'S WINDOW SCREEN FRAMES**

Patented October 13th, 1885.



These frames can be easily fitted to any ordinary window by simply sliding the sticks along on each other to the required size, fastening by nail or screw and sawing off projecting ends. The frame thus made is much cheaper and in appearance far superior to those made by mechanics generally; is capable of adjustment from sizes given down to nothing, and insures close fitting and accurate joints.

MANUFACTURED BY

**E. C. STEARNS & CO., SYRACUSE, N. Y.**

Send for Price List.

**BRADLEY'S UPRIGHT CUSHIONED HELVE HAMMER**

Established 1882.

Combines all the best elements essential in a first-class Hammer.

Has more good points, does more and better work and costs less for repairs than any other Hammer in the World.

**BRADLEY & CO., Syracuse, N. Y.**

**BRADLEY'S HEATING FORGES.**

ESTABLISHED 1882.

For Hard Coal or Coke. Indispensable in all shops to keep Bradley's Cushioned Hammers and anvils fully employed and reduces cost of production.

**BRADLEY & CO., Syracuse, N. Y.**

**STANLEY G. FLAGG & CO.,**

PHILADELPHIA, PA.

Office and Works,  
N. W. Cor. 19th St. and Pennsylvania Ave

MANUFACTURERS OF

**STEEL CASTINGS**

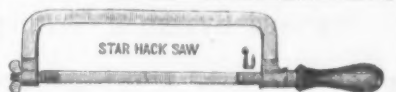
A Substitute for Steel and Wrought Forgings.

Circulars Sent on Application.

**STEEL CASTINGS**

Railroad and Machine Castings,  
1/2 lb. to 10 tons. Locomotive Cross  
Heads and Gearing a Specialty

**Eureka Cast Steel Co.,**  
307 Walnut St., PHILADELPHIA.



We are now Sole Agents for all of the Celebrated Star Saws, comprising

Star Hack Saws,  
Star Bracket Saws,  
Star Butchers' Saws.

The Star Hack Saw will cut Iron and Steel as other saws cut wood.

The Star Bracket Blades are so good that they command nearly all the Bracket Trade of this country, and have a large foreign demand.

The Star Butchers' Saws will cut twice as long without filing as any other saw in use. None of these Star Saws are to be filed, as the price is much less than the cost of filing.

Hack Saw Blades, 8 in. .... \$0.65 per dozen.

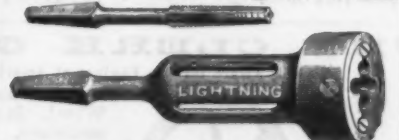
Butchers' Saw Blades, 24 in. .... 1.00 "

Bracket Saw Blades, 600 to 700 ..... 1.00 per gross.

Usual Discount to Dealers.

**MILLERS FALLS CO.,**

74 Chambers St., New York

**Labor Saving Tools.****LIGHTNING & GREEN RIVER SCREW PLATES.**

Bolt Cutters, hand and power. Drilling Machines, Punching Presses, Tire Spenders, Tire Upsetters and other Labor Saving Tools. Send for Price List.

**WILEY & RUSSELL MFG. CO., Grandfield, Mass.****COLUMBIA BICYCLES AND TRICICLES.**

Reduction in Prices and Many Improvements.

Spring Catalogue sent free.

**THE POPE MFG. CO.,**597 Washington St., Boston.  
Branch Houses:  
12 Warren St., New York;  
115 Wabash Ave., Chicago.**AIR COMPRESSORS**For CATALOGUES, ESTIMATES, Etc. Address,  
**Clayton Compressor Works,**  
Near Brooklyn, N. Y.  
OFFICE, 43 DEY STREET, NEW YORK.

**A. G. PECK & CO.,**  
Cohoes, N. Y.

MANUFACTURERS OF

**AXES, ADZES,  
BROAD AXES,  
HATCHETS.**

Send for Catalogue and Price List.

**THE Buffalo Steel Foundry,**

BUFFALO, N. Y.

**PRATT & LETCHWORTH, Props.**

Orders and Correspondence Solicited.

**SCRANTON BRASS & FILE WORKS.****J. M. EVERHART,**  
Manufacturer of**BRASS WORK**For Water, Gas and Steam.  
Exhaust Steam Injector, using waste steam only, returning it to boiler with water at 150 degrees.Also PATENT CUT FILES.  
**Scranton, Pa.****RUSSELL, BURDSALL & WARD**

PORTCHESTER, N. Y.

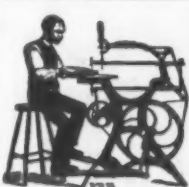
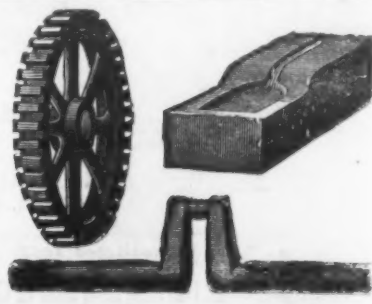
MANUFACTURERS OF

**CARRIAGE, TIRE, BOLTS, FLOW, STOVE, &c.**

Carriage Bolts made from Best Square Iron a Specialty.

**F. W. WURSTER,  
IRON FOUNDRY  
AND AXLE WORKS,**  
130 to 142 First St.,  
Brooklyn, N. Y.**AXLES**SUPERIOR  
**WAGON, CART AND  
CARRIAGE AXLE.**

Our facilities enable us to quote the trade lower prices than any other manufactory. Send for price list.

**Foot Power Scroll Saws, &c.**The Latest and Most Improved for the WORKSHOP OR AMATEUR.  
Sold on trial, if desired. New Catalogue free.**SENECA FALLS MFG. CO.,**  
255 Water Street, Seneca Falls, N. Y.**SOLID STEEL CASTINGS,****FROM CRUCIBLE and OPEN HEARTH.**

HYDRAULIC CYLINDERS AND GEARING SPECIALTIES.

**CUN METAL ROLLS, PINIONS and CASTINGS.****AIR-FURNACE REFINED MALLEABLE CASTINGS.**

All Stock used by us is subject to Chemical Analysis in our own Laboratory.

**ISAAC C. JOHNSON & CO.,**

Established 1853.

SPUYTEN DUYVIL, NEW YORK CITY.

**STANDARD STEEL CASTING CO.**  
THURLOW, PA.

OPEN HEARTH AND CRUCIBLE

**STEEL CASTINGS**

QUALITY EQUAL TO STEEL FORGINGS

**BEAUDRY'S UPRIGHT CUSHIONED POWER HAMMER.**

By far the best. Most generally useful and durable. Blow accurate, powerful and elastic.

**BEAUDRY & CUNNINGHAM**  
BOSTON, - - Mass.



**STEEL BUTTER SPADE,**  
Rust Proof,  
Wood and Malleable Handles.

**SAXTON & OSGOOD,**  
31 and 33 LLOYD ST., BUFFALO, N. Y.

MANUFACTURERS OF  
**HARDWARE SPECIALTIES.**  
Write for Price Lists and Discounts.

**DECIDED SUCCESS.**

Full Size, No. 80.

EVERY ONE  
WANTS**Gem Wire Coat and Hat Hooks,**BECAUSE { They are Strong and Durable,  
Easily put up, and  
Reasonable in Price.

Four Sizes: 2, 2 1/2, 3 and 3 1/2 inch.

Made of Steel and Brass Wire.

Send for Catalogue of the above and a full line of Spring Hinges and Door Springs for all kinds of Doors.

**VAN WAGONER & WILLIAMS CO.,**

82 Beekman Street, New York.

used in the  
lapsed tube  
confirmation  
most extraor-  
tube anywh-  
neglect of the  
was allowed  
would have  
of the steel to  
the engraving  
don Engineer  
a short time  
made at the  
Steel Works,  
at a colliery  
land. The fl  
exhibited at  
smaller engr  
the Governm  
the large view  
graph. Conce  
"A very s  
indented port  
smooth, even  
test of collap  
curves were p  
uted fluid pro  
portion must